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Contents

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Contents (*Continued*)

1943 PROGRAM PLANS FOR THE
AMERICAN FARM ECONOMIC ASSOCIATION

A T a meeting of the Executive Committee in January 1943, the opinion was generally expressed that it would not be feasible to hold an annual meeting of the Association in 1943. However, it was suggested that the final decision should await further developments. An annual meeting during the holiday season in 1943 now seems out of the question.

Suggestions were received from many sources that one or two regional meetings of the Association should be held in lieu of a national meeting. These meetings would make it possible to bring members of the Association together to consider wartime problems without entailing long distance travel.

Suggestions for a regional meeting were more numerous from the Mississippi Valley than from any other section of the country. After considerable correspondence with members from this section of the country, it was, therefore, decided to hold a meeting at Hotel Statler in St. Louis, on September 15 and 16, 1943. It is hoped that many members and friends of the Association will find it possible to attend.

If this meeting proves successful, it might be desirable to consider similar meetings in other sections of the country as a substitute for the annual meeting during the emergency period. It is even possible that regional summer meetings of the Association have a distinct place as supplements to the annual meeting which is customarily held at the same time and place as other social science associations.

The Rural Sociological Society also plans to hold a Mississippi Valley meeting at Hotel Statler, St. Louis, on September 15 and 16. The tentative program for the American Farm Economic Association meeting is printed on the following pages of this Journal.

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SHERMAN E. JOHNSON
President

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TENTATIVE PROGRAM—MISSISSIPPI VALLEY MEETING
AMERICAN FARM ECONOMIC ASSOCIATION

HOTEL STATLER, ST. LOUIS
SEPTEMBER 15 AND 16, 1943

September 15

Forenoon: 10:00 A.M. "Inflation and the Farmer"
   Chairman, G. S. Wehrwein, University of Wisconsin
  1. Price Control and the Wartime Pricing of Farm Products
    Paper by E. J. Working, University of Illinois
    Discussion by A. C. Hoffman, War Food Administration

FOOD PRODUCTION POLICIES IN WARTIME[1]

SHERMAN E. JOHNSON
Food Production Administration

FOOD needs are now pressing on the limits of potential production in a manner characteristic of wartime. At the beginning of the present war in Europe many persons felt that this war would be "different" as far as agriculture was concerned. There would be no pressure on food supplies. Unfortunately, this was the general public attitude toward the food situation up to the early fall of 1942, when we were suddenly confronted with a meat shortage even though meat slaughter for the year was about 30 percent above the relatively high output of the years 1935–39. As long as this attitude prevailed it was difficult to obtain full support for an "all out" war food program. In considering the food production problem it is well to remember therefore that the need for increased food production has not been generally recognized for more than 8 to 10 months. Now there is fairly general recognition that our food and fiber needs for military, civilian, lend-lease, and war relief are so great that even maximum production from our tremendous agricultural plant will not be adequate to meet these needs.

In building a wartime food production program we need, first of all, to consider the pattern of food needs. Second, we should analyze the most economical food sources for meeting each of those needs, and their priorities in event that some needs cannot be met. Third, we should determine what constitutes maximum production in accordance with the needed pattern. And, fourth, we should develop the type of programs that are most likely to ob-

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[1] A paper presented before the Western Farm Economics Association at a meeting held at Berkeley, California, June 25, 1943. The views expressed by the author in this statement are advanced for discussion purposes. They do not reflect any Bureau or Department viewpoint on the problems considered.

tain maximum production. It goes without saying that effective execution of the programs that are developed is most important of all.

Pattern of Food Needs

Foods differ greatly both as to types of essential nutrients which they provide and as to quantities that can be produced with given amounts of land, labor, and production materials. From the nutritional standpoint foods may be classified in the following five major groups. Good nutrition requires a combination of foods from each of these groups.[2]

(1) *Grain products:* Important as inexpensive sources of energy and protein. The lightly-milled products are also excellent sources of iron and vitamins of the B group.

(2) *Fats and sugars:* Economical sources of food energy. Some of the fats also carry important amounts of vitamin A. These foods add flavor and satiety value to diets which are highly prized in many parts of the world.

(3) *Meats, poultry, eggs, fish, legumes, and nuts:* Important sources of proteins and certain of the vitamins of the B group. Eggs are sometimes classed separately because of their richness in vitamin A.

(4) *Milk and milk products:* The outstanding economical source of protein of high quality, calcium, and riboflavin. Also important for many other vitamin and mineral elements.

(5) *Vegetables and fruits:* These differ widely in their nutritive value. Special emphasis would be given to the leafy green and yellow vegetables for their vitamin A value; tomatoes and citrus fruits (among others) for vitamin C value; potatoes and other starchy tubers as economical sources of energy and for some of the mineral elements and vitamins.

Our wartime pattern of food needs is considerably different than it would be if we were producing only for expanded civilian needs in this country. Military food needs are different from what would be required by the same population in civilian life. We are also called upon to supplement the food resources of our allies. The supplements that are most needed are high-protein foods and fats. To save shipping space it it necessary to prepare these foods in the most concentrated form.

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[2] From material prepared for consideration by the United Nations Conference on Food and Agriculture, May, 1943.

If feed and other resources were ample, it would be desirable to concentrate on meeting our requirements for proteins and fats from animal sources. But since expansion along these lines is definitely limited, it will be necessary to fill a part of these requirements with vegetable proteins and vegetable oils. The need for milk solids to balance the food ration is so great that it seems necessary to place major emphasis on milk products among the animal proteins. A question arises as to how far the shift from animal products to food crops for direct consumption could be carried if necessary. Nutritionists tell us that the psychological limits to such a shift in diets are likely to be reached long before the physical limits.

The quantity as well as the pattern of our food needs points toward increased emphasis on the high-protein direct food crops and the oil crops, which are sources of both oil and proteins. Looking forward, there will be need for diverting an increasing proportion of soybean, peanut, and cottonseed meals to edible uses. Dry beans and peas are important sources of high-protein foods among the direct food crops. In the vegetable group, Irish and sweet potatoes must be provided in adequate quantities to furnish the basic energy requirements that can be obtained from starchy vegetables. Other vegetables will need to be increased for utilization both in fresh and processed form. Somewhat larger consumption of grain products is anticipated.

Economical Sources of Food Nutrients

The pattern of food needs already described implies emphasis on the most economical sources of providing the needed food supplies. Emphasis on increasing meat production was justified when we had ample feed reserves, and as long as food requirements did not press too heavily on our ability to produce food. Now, however, we are approaching a period of dwindling feed reserves. Under these circumstances we must be selective both as to the size of the entire livestock enterprise and as to relative emphasis on different types of livestock. Looking forward, it may be necessary to reduce total livestock production below the record levels of 1943 in order to balance our livestock numbers with the feed supplies that we shall be able to grow or import. Meat animal slaughter in 1943 is likely to average about 149 percent of 1935–39. This means that a very considerable reduction could take place if necessary, and meat output would still remain above normal levels. The amount of re-

duction in the different types of livestock should be considered on the basis of output for feed, labor, and other resources used in production. Grain finishing of beef cattle may be one of the first places to make some reduction in feed consumption. Meat output per unit of resources is relatively much less than from hogs. Cattle and sheep enterprises should, however, be maintained to the full extent that they can be supported on range, pasture, and roughage feeds. Livestock produced from range and roughage represent very economical additions to our food supply.

About 40 percent of the total consumption of concentrated feeds by livestock goes to hogs. Therefore, the recent upward curve in hog production will have to be leveled off considerably in order to effect material savings in concentrate feeds. Egg production is a relatively economical use of feed for the food values obtained. Moreover, on many farms poultry is a sideline enterprise, which means that much of the labor used could not be shifted to other types of production. Broiler and other specialized poultry meat production are relatively less economical in feed and labor utilization.

When all the milk solids are utilized, the dairy enterprise provides the most economical source of some of the needed animal proteins as well as of calcium and riboflavin. It therefore seems desirable to maintain dairy production at least at present levels, and even to encourage some increase in output. A larger portion of our milk should go into channels which will utilize all the milk solids for human food.

Among the direct food crops, emphasis should be given to those which supply the most nutrients in their particular food group for the land, labor, and materials used in production. Recognition must be given, of course, to other factors such as bulk and palatability of particular foods.

Analysis of relative economy in producing different foods cannot be based entirely on average relationships. Many foods are relatively economical users of land and labor when produced at present levels of output, but production increases would use resources much less economically. Therefore, it becomes a question of considering the resources used for prospective increases in production as a basis for our decision on choice of crops or livestock. A recent study by the Bureau of Agricultural Economics analyzes the relative economy in the production and marketing of different types of

foods.[3] This study recognizes that conditions vary greatly among different producing areas and that the economy of producing different kinds of foods must be analyzed area by area in order to draw valid conclusions as a basis for local production plans. A first approach to such analyses is being taken in the maximum wartime production capacity study that is being carried on in cooperation with State and Federal agencies.[4]

Pattern of Food Production

From the pattern of food needs and a study of the most economical sources for supply those needs at different levels, we arrive at a first approximation to a food production pattern. Although much work is needed to fill in the details, the general outlines are fairly clear.

Every effort should be expended to maintain, and even to increase, milk production for utilization of milk solids. Livestock other than dairy cattle must be balanced with the feed supply that can be grown after our needs for direct food crops and fiber and special crops have been met.

Any reduction of livestock numbers from present high levels that might be necessary should take place in accordance with the relative economy of producing each type of livestock at different production levels as indicated above.

Among the direct food crops, major emphasis should be given to the high-protein and oil crops, and to Irish and sweet potatoes, as well as to other vegetables. A sufficient acreage of wheat and other food cereals should be grown to supply our direct food needs. In addition, wheat should be grown even for feed in areas where it will produce more feed nutrients per acre in relation to labor requirements than other feed crops, and where production does not conflict with more urgently needed direct food products, such as beans and potatoes. Even though wartime cotton consumption is making heavy inroads on reserve stocks, some of the acreage usually devoted to cotton may better serve the war effort by producing peanuts, sweet potatoes, fresh vegetables, and feed for dairy cows in milk shortage areas. In areas adapted for peanuts about three

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[3] "Using Resources to Meet Food Needs," by Raymond P. Christensen, Bureau of Agricultural Economics, U. S. Dept. of Agriculture, May, 1943 (mimeographed).

[4] Some of the material prepared as a part of this project has been used in the preparation of this paper.

times as much oil can be obtained per acre from peanuts as from cotton, and with the use of only two-thirds as much labor. On the other hand, there are areas, such as the Mississippi Delta, where nearly as much oil can be produced from cottonseed as from soybeans, and at the same time we get increased supplies of longer staple cotton.

The geography of food production should be determined from analyses of the relative efficiency of each area in supplying the needed increases for different products. If we can approximate the most economical pattern of food production for each producing area in relation to national needs, we still will have before us the problem of combining these into a balanced pattern of national production that gives proportionate emphasis to each product. That involves assigning values to different products in accordance with needs in such a way that the last unit of each product is just as valuable as additional units of any other product.

It is necessary to give much more than usual attention to producing the bulky and perishable products as close as possible to consuming centers. The increased output that will be needed of potatoes and other bulky and perishable products will severely tax transportation facilities.

Maximum Production Capacity

It is recognized that our maximum capacity for food production is not represented by one fixed level. But perhaps the most realistic approach is to analyze capacity in terms of a specific pattern of production designed to meet the pattern of food needs, and in the light of decisions with respect to how far we can go in shifting toward the most economical sources of meeting those needs. Maximum production possibilities must also be considered within the limits imposed by the operation of the general economy in a situation of wartime scarcity. In other words, output could be increased very considerably if land were the only fixed factor and if agriculture could obtain labor, equipment, and supplies such as fertilizer in whatever quantities would be needed for maximum production.

Increasing Cropland. All of the resources used in agricultural production have physical limits under wartime conditions. This is true even of our land resources. It is estimated that the acreage of land used for crops can be increased to 377 million acres from the 351 million acres used in 1942, and the 339 million utilized for crops in 1939. The source of this increase would be about 75 percent from

idle or fallow land (much of it in the Great Plains) and 25 percent from a reduction in plowable pasture. Some additional increase could be obtained from stepping up irrigation and drainage developments. However, many developments of this type require large amounts of labor and scarce materials and some would not be available for crop production in the next 2 or 3 years.

Shifts in Production. Since the land base cannot be greatly increased it will be necessary to depend largely upon shifts in production to obtain greater output of needed products from land now in crop production. This means a shifting wherever possible to the more intensive crops indicated by the pattern of food needs. That is a conversion job similar to converting automobile factories to tank or airplane production. If it is to be achieved to the extent necessary to meet our needs, we must be ready to pay for the conversion cost. That cost is represented by new investments in equipment and storage facilities and also by compensation to new producers for shifting to production of a product with which they have had no experience. In many instances such shifting will mean lower yields than in old producing areas or on farms now producing the same product. Therefore, it means higher cost production. Even when the additional output comes from farms that are already producing the same product, the increase will usually be produced at higher cost.

In considering this conversion job we must be bold in our thinking about its possibilities. It will not suffice to project increases from recent trends. No one projecting acreage trends in peanuts would have been bold enough to assume in the fall of 1941 that the acreage of peanuts harvested for nuts would be increased from 1.1 million acres in 1941 to 3.6 million in 1942. Despite all the difficulties encountered, that increase represents a marvelous achievement in wartime conversion. The 1943 production goals call for 5.5 million acres. It may be difficult to obtain that acreage without giving more consideration to meeting the conversion cost that is involved. Moreover, an even larger acreage will be needed in 1944.

Taking a product more familiar to the West, we planted 2.1 million acres of dry edible beans in 1942. Our goal for 1943 is 3.3 million acres, which has been very difficult to obtain in the old producing areas. Looking forward to 1944, we will need at least 4 million acres in beans. It seems necessary to go into new producing areas for the increased production. This will require analysis of the areas with the best potentialities in view of the need for other

products and then the provision of adequate inducements to farmers to carry out the conversion job.

Improved Practices. A third means of increasing production from a given land base is, of course, to increase the rate of output per acre and per animal. Over a period of years there are many opportunities in this direction. However, if educational methods alone are to be depended upon to achieve the increased efficiency required, our progress is likely to be rather slow. One of the greatest opportunities to increase quickly the output per acre seems to be the application of fertilizer. This opportunity should be exploited to the fullest extent that fertilizer can be made available.

It has been estimated that yield increases ranging from 5 to 25 percent could be obtained from some of the major crops and from plowable pasture if a strong national program were adopted to facilitate carrying out certain improved practices including greater use of fertilizer. If confined to individual crops, even larger increases could be obtained.[5]

Labor, Machinery, and Materials. Regardless of the source of increases in production they will require somewhat larger inputs of labor, machinery, and materials. The labor shortage in agriculture has been emphasized a great deal in the last 8 to 10 months. In considering labor needs we should distinguish between operator and other family labor, year-round hired labor, and seasonal peak labor. It is probably easier to meet the seasonal peak loads with inexperienced labor from unusual sources than it is to meet the year-round labor needs. Because of the demands for labor from other sectors of the economy it will be necessary for agriculture to solve its labor problem largely within its own occupational group and with some aid from the unusual labor sources in surrounding towns.

Some estimates have been made which indicate that agricultural production could be increased from 5 to 10 percent above the 1942 level with only about a 3 percent increase in the labor supply if measures were taken to utilize more effectively the labor now in agriculture that is somewhat under-employed. Relative under-employment exists on small farms in all States. If voluntary measures could be taken within each State for better utilization of farm labor which is now somewhat ineffectively employed, production

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[5] Estimated by a joint committee of the Bureau of Plant Industry, Soils and Agricultural Engineering and Bureau of Agricultural Economics as a part of the study of maximum wartime capacity.

could be increased considerably without drawing on any outside sources for additional labor. In addition, women and children, older men, and part-time workers from surrounding towns, if properly mobilized, can assist materially in the relatively unskilled peak-season jobs.

Machinery and equipment shortages can be just as serious as labor shortages and sometimes more so when the lack of a key machine prevents harvesting a crop before damage or spoilage occurs. To a certain extent labor-saving machinery is a substitute for labor. Therefore, more adequate supplies of certain types of farm machinery would help materially in increasing production with a given labor force. On many farms an older man or a youth can replace an able-bodied man in operating a machine although they may not have the strength to do a full man's work at heavy hand labor. Where considerable shifting in crop enterprises requires new types of equipment, it is necessary, of course, to make available a minimum amount of such equipment in order to make the shift.

Potential Production. If fairly effective measures can be taken to meet minimum needs for labor, machinery, and materials, it may be possible to increase food production as much as 6 to 8 percent above the record production of 1942. This statement assumes average crop yields and balancing livestock production with current feed supplies, whereas the 1942 output had the benefit of extremely favorable crop yields and large feed reserves. Actually therefore, the increase suggested would amount to an increase of about 15 per cent above 1942 output adjusted for normal yields and feed supplies from current production. More important than the actual increase in output would be the changing pattern of production if the pattern were shifted in the direction indicated above. It would mean that a much larger population could be fed adequately from the food output.

If we could develop programs which would obtain wide adoption of improved practices it might be possible to increase total output another 5 to 10 percent above 1942 levels.

Programs to Obtain Maximum Production

Any discussion of the type of programs that might be devised to obtain maximum production must recognize the different elements in the present situation which form the starting point for program making. Among these are existing legislation, both with

special reference to agriculture and for the control and guidance of the wartime national economy. The state of public opinion with reference to a food program is of primary importance, and we cannot ignore the fact that certain production operations are already under way and that they can be neither completely reversed nor greatly accelerated except at the beginning of the new production cycle. Within that setting it might be worth while to examine five different program approaches that might be considered as alternatives in attempting to achieve maximum production. In practice it would be possible to use the measures that are discussed in somewhat different combinations. Although the advantages and disadvantages of each approach are mentioned, no advocacy is intended. Neither should this discussion be taken as a forecast of next year's food production program.

1. *Uncontrolled Prices.* Although a policy of uncontrolled prices could not be carried out within present legislation, this alternative should be mentioned because there are some persons who apparently believe that it is futile to attempt to control the price structure. These persons say that if price controls were eliminated the prices of farm products would rise more rapidly than other products and therefore stimulate maximum production. This argument is usually supplemented with a statement that effective price control is not possible and that all it does is to postpone an inevitable inflation, which will go even higher because of the control attempted at the beginning stages. It should be pointed out that under uncontrolled prices some agricultural products that are much needed from a nutrition standpoint are likely to fare very badly because they have an institutionalized price structure. This is especially true of dairy products. Moreover, existing legislation prescribes price changes for certain farm products. These, therefore, could not be adjusted automatically in an uncontrolled price economy unless that legislation were repealed along with the Price Control Act.

The crucial question, of course, is whether such a program of uncontrolled prices would be effective in maximizing agricultural production. Although reasoning from analogy is dangerous, and one cannot argue that prices were completely uncontrolled in the last war, we do know that despite the stimulus of highly inflated prices there was no startling increase in the total volume of farm production during the last war. From the period 1910–14 to 1918–19 the total increase in output was about 10 percent as compared with a 28

percent increase in output from the period 1935–39 to 1942. Total production in the period 1935–39 was nearly 10 percent higher than the war years 1918–19. The recent increase therefore took place from a higher starting base, but weather conditions have been more favorable in the recent war period. Moreover, the *laissez faire* approach with uncontrolled prices would not induce the type of shifts in production which were indicated as desirable in the early part of this paper, and these shifts will result in feeding more people adequately than is reflected in the increase in the production index.

2. *Support Prices and Government Assistance in Providing Labor, Machinery, and Other Supplies.* If we accept the framework of present price control legislation and certain specific legislative provisions for farm products, such as the Steagall Amendment, it is possible to establish a system of support prices for farm products that will tip the alternative income balance in favor of the products most urgently needed. Price ceilings on farm products that are less urgently needed would need to be adjusted proportionately in such a program. In order to be most effective, a support price program should be announced in advance of the beginning of the production period for each product, and the support prices should not be changed during the production period. It is also important that a farmer know what the support price means in terms of the prices received at his point of sale.

If a price support program of this type is accompanied with effective measures in providing some increases in labor, equipment, and supplies, it would furnish considerable stimulus to maximum output in a desirable pattern of food production. Perhaps the best illustration of farmer response to favorable prices is the sustained increase in hog production which has resulted from the maintenance of a very favorable hog-corn ratio. Some very difficult problems arise in carrying out a purely voluntary program of this type. For example, wheat production for the 1944 harvest is likely to seem so profitable that it will be carried beyond the limits of safety in high hazard areas. The need for conservation practices as well as for other crops than wheat may be disregarded. In certain other areas it may seem much more profitable to grow what might under wartime conditions be classified as luxury crops—those which require a large amount of labor, materials, and transportation—in preference to crops which would make a much greater contribution to our food supply for the resources used. One way of

meeting this problem would be to make specific allocations of, or to assign priorities on, supplies and transportation in line with production goals distributed to individual farms. It would also be possible to condition price supports and other program provisions on adherence to goals. Therefore to be successful such measures would have to be carried out in an equitable manner, and that becomes a difficult administrative job.

Support prices supplemented only with assistance in obtaining labor, equipment, and supplies may not achieve maximum production. There are some 6 million farms in this country. Maximum output implies that each of the 6 million farms makes as full utilization of the land, labor, and equipment resources as is possible with the variable resources that are obtainable. Some farm operators perhaps can make their most effective contribution by working all or part of the time on more productive farms. Others will need assistance in obtaining livestock, seed, fertilizer, and perhaps some equipment, either by purchase or by arrangements for custom work. To obtain maximum production on all farms it may be necessary to go somewhat further than a generalized program which provides for support prices and assurance of certain supplies of labor, machinery, and other materials.

3. *Support Prices, Goals, Material Grants, and War Risk Insurance*. A program of support prices such as outlined above could be combined with a program which also develops national, state, local, and individual farm goals for all important farm products. If they are to be at all effective, goals for individual farms must represent the farm by farm potentialities for maximum production of a locally adapted food production pattern. The following procedure might be used. First, there would be an intensive educational program stressing the products that need to be increased in each locality. This would be followed by distribution to each farmer of a copy of a farm plan work sheet on which the farmer would work out for himself the individual goals for the principal products that were best suited to his production resources. Later, after conference with a representative of the Food Administration, the farmer might adjust his original intentions to provide for maximum output. The revised and completed farm plan would then serve as the basis for any programs designed to facilitate maximum production. All the agencies would need to work on an individual farm basis to supply the resources that constitute the limiting factors on each farm. In

that way partially idle or additional resources would be utilized to the fullest extent. Certain production materials, such as fertilizer and seed, might need to be provided for the crops indicated on the farm plan in the same way as conservation materials are now handled by the AAA program in order to assure maximum production of certain critical crops. This would be one way to stimulate directly the use of improved practices to increase production.

In the Great Plains and Pacific Northwest wheat areas and in some humid areas as well, certain practices need to be maintained to prevent irreparable damage to the soil and to maintain yields even for the war period. For instance, strip cropping and certain summer fallow practices are partial insurance against failure in wheat production. Bean production in the Great Plains can be made much less hazardous if strip cropping is practiced. Payment for conservation practices of these types might be provided for in this kind of production program.

Of primary importance as a stimulant to production of new crops such as dry beans and flax in some high risk areas would be a program of war risk insurance. Such a program would be most effective if it did not involve a premium payment and if it were available to all growers of the specific crops on which it was applied. Local government representatives could inspect the insured crops to assure workmanlike performance, and losses could be paid in accordance with the stage of development of the crop at which the loss is sustained. Since increases in production which necessitate expansion into new high hazard areas are desired in the interest of national welfare, it seems equitable to insure farmers who undertake such expansion against the risk of losses which would not be taken if the crops usually grown were produced.

4. *Production Contracts.* It has been suggested that one way of obtaining maximum production would be for the government to contract with individual farmers for raising the products for which they are best equipped up to the level for each product that would represent a balanced production pattern. In support of this proposal it is argued that the government makes contracts with other suppliers to obtain war materials. The large number of farms and the varied production on each farm would make such an approach difficult to administer.

War Hemp Industries, Incorporated, a subsidiary of the Commodity Credit Corporation, has contracted with individual farmers

for the production of hemp in 1943. Contracts have been written for sufficient acreage of hemp to utilize the plant facilities to be established in each hemp producing area. The same procedure might be utilized for some other products of which greatly increased production is desired and where new producing areas must be established. It would be a partial application of the contract approach.

To write contracts with all farmers covering their total output would, of course, require a very large administrative set-up and would have to result in large additions to production if it were to be justified in a war situation which requires economical use of manpower for all types of work.

One conceivable means of approaching the production problem would be to ask farmers for bids on their output based on average yields of each product. Bids would be accepted up to the levels that would be desired for each product. This would mean differential pricing for each product based on the farmer's estimate of the compensation he would need to produce at the level indicated by his bid. It is obvious that tremendous administrative problems would be involved in such an approach. One advantage, however, would be that it would tend to compensate for the extra costs incurred by the additional output. If any type of contract provision were to be used, it would be necessary to give priorities on the allocation of scarce supplies of labor, machinery, and other materials to producers who agree to carry out their contracts.

5. Production Allocations. The most extreme alternative would be to use the War Powers Act as a basis for making farm by farm allocations of production quotas for each product, or for the major products. Such allocations would, of course, have to be made on the basis of resources available for production of the particular product or on assurance of making available such resources. Equitable returns for carrying out production of assigned quotas would need to be guaranteed. Such a step would mean national control of production in the agricultural industry. When the automobile industry was forced to abandon the manufacture of cars, the actual conversion to war work was carried out on a contract basis. Although other countries have taken such steps to gear agricultural production for war needs, it seems very doubtful that they are needed in this country, or that they would increase farm production.

In Summary

Production of farm products is carried out on 6 million farms. To attain maximum output of the products we need most on that many different producing units is no simple task. At one extreme are those persons who would abolish all attempts at directing the course of agricultural production. They prefer alternative number 1. At the other extreme are those who say we cannot fight a successful war without gearing all production closely to our specific war needs. Along the lines of alternative number 5 it may be questioned that such drastic steps would increase output. It might be difficult to obtain support of the rank and file of farmers for such a program. On the other hand, perhaps the inherent patriotism of farmers can be stimulated to greater effort by encouraging voluntary action to the fullest possible extent. That approach will require much more work with individual farmers on their production problems than we have undertaken so far.

CONSTITUTIONAL ASPECTS OF PUBLIC REGULATION OF BUSINESS PRICE POLICIES*

WILLIAM H. NICHOLLS[1]
Iowa State College

"Mastering the lawless science of our law,—
That codeless myriad of precedent,
That wilderness of single instances."
—Tennyson, *Aylmer's Field*

WITH the increasing emphasis upon public policy during the past decade, it has become far more important that economists have a working knowledge of the legal framework—and particularly its judicial interpretation—within which American public policy toward business must operate. For this knowledge, general economists have frequently had the opportunity, directly or indirectly, to study the basic principles of American constitutional law. Only recently, however, have agricultural economists—even those in the field of agricultural marketing and prices—turned their attention to the neglected field of competition in, and public regulation of, the agricultural processing and distributing industries.

Yet such industries have certainly had their share of public intervention, with continuing anti-trust prosecutions, regulation of stockyards and the grain trade, government control of fluid-milk marketing, and the like. A quickening interest in this field is shown, however, by the recent proposals of agricultural economists that fluid-milk distribution be made a public utility and that public policy be directed toward rationalizing the transportation or processing of milk, butterfat, and farm supplies (such as petroleum products). Such proposals have important constitutional aspects with which agricultural economists should be, but seldom are, familiar.

For such readers, it may be helpful to survey briefly the constitutional aspects of government regulation of business price and rate

policies.[2] It is to this purpose that the present discussion is directed. And, for this reason, the classification to be followed is based on the various articles of, and amendments to, the Constitution. Thus, we begin with a consideration of the judicial interpretation of the state police power and the interstate commerce power. The next step calls for a survey of the various important constitutional questions arising under the application of the "due process" clause of the Fourteenth Amendment to utility rate-making problems, price regulation of quasi-public enterprise, and state anti-trust action. We conclude with a consideration of the Court's translation of the "due process" clause of the Fifth Amendment into "freedom of contract" and "reasonable" law.

While it will be seen that many key cases have been directly concerned with agricultural processing firms or industries, it should be obvious that, by the very nature of the judicial process, decisions initially only remotely related to this sector of business may have a vital bearing on public regulation of its price policies. It is believed that this fact alone will justify a breakdown of our subject matter along constitutional, rather than economic, lines. In this way, the basic legal principles will stand in bold relief for economists ill-prepared to distinguish between the relevant and irrelevant paths of the legal labyrinth.

In America, there was little concern with industrial monopoly prior to the Civil War, but the rise of large-scale business enterprise shortly thereafter brought the monopoly problem to the fore. The failure of state action under the common law against railroad combinations led to the passage of the Interstate Commerce Act in 1887. But the control of public utilities other than transport long continued under the sole jurisdiction of the state police power, implemented through direct legislative control or, increasingly, through state public utility commissions. In exchange for the authority of a public grant of monopolistic privileges, utility enterprises were recognized by the courts as being subject to regulation of prices and rates. Furthermore, in a sort of twilight zone between "monopolistic" and "competitive" industry, the courts early ruled that a few presumably competitive industries—of a type which the common law had long held as subject to special price regulation

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[2] While many of these same constitutional questions are involved in public policy toward the working conditions of labor and toward agricultural production, space will permit only their incidental consideration here. For the broadest possible survey of these problems within a single article, see Henry Rottschaeffer, The Constitution and a "Planned Economy," *Mich. Law. Rev.*, Vol. 38 (1940), p. 1133 et seq.

because of their quasi-public nature—were subject to comprehensive public control.[3]

But the great majority of industries were considered by the law to be freely competitive. It was in order to assure that such industries would continue to be so, subject only to the indirect price control of the open marketplace, that the Sherman Anti-Trust Act was passed in 1890. And the Clayton and Federal Trade Commission Acts of 1914 were poured into the same "competitive" mold. Only by a grasp of this categorical treatment in classifying industries—so long common to the law and economics alike—is it possible for modern students of "monopolistic competition" to grasp the *raison d'être* of much of the constitutional law of the past fifty years.

Behind this legal philosophy of competition lay a century of strongly individualistic common law, whose predetermined premises and fixed techniques long prevented the adjustment of juridical thought to conditions of unprecedented social change.[4] Only in recent years has the law, like the other social sciences, reawakened to the need for such an adjustment.[5]

With this word of background, we may turn to an examination of the changing constitutional interpretations by which the Supreme Court has directed public regulation of the price policies of public utilities, "quasi-public" industries, and "competitive" industries.

1. *The State Police Power*

The Tenth Amendment to the Constitution provides that "The powers not delegated to the United States by the Constitution, nor prohibited by it to the States, are reserved to the States respectively, or to the people." This attempt to draw a line between the jurisdictions of the states and of the national government has been one of the most difficult tasks with which the judiciary has been

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[3] *Munn v. Illinois*, 94 U. S. 113 (1877). Cf. below, p. 562–563.

[4] Recognition of this fact led Justice Holmes to make his famous dissenting observation that "The Fourteenth Amendment does not enact Mr. Herbert Spencer's Social Statics." (*Lochner v. New York*, 198 U. S. 45 (1905), at 75). For an excellent discussion of the factors tending to individualize the common law, see: Roscoe Pound, The Spirit of the Common Law, Marshall Jones Co., Boston, 1921, espec. pp. 27–28.

[5] That social scientists have yet fully met this need is another matter, however. In economics, for example, it is the author's view that we have now swung too far toward the other extreme of anti-individualism (William H. Nicholls, Social Biases and Recent Theories of Competition, accepted for the November 1943 issue of the *Quarterly Journal of Economics*).

faced, frequently resulting in an anomalous intermediate area within which neither state nor national government could operate. In the regulation of nation-wide business, the result has of necessity been the ever-increasing encroachment of the federal government upon the preserve of the states under its interstate commerce power, which we next examine. In fields where federal regulation became imperative, the court only gradually recognized its constitutionality, belatedly when one remembers that Article VI of the Constitution declares itself, "and the laws of the United States which shall be made in pursuance thereof, . . . the supreme law of the land." At the same time, the court limited the power of the states under the Fourteenth Amendment, which declares that "nor shall any state deprive any person of life, liberty, or property, without due process of law." While recognizing the right of the states to regulate public utility rates within their borders, the Supreme Court, as we shall see later, largely circumscribed this right by the exercise of judicial review on the question as to whether rates so fixed were confiscatory of property under the Fourteenth Amendment. Furthermore, to legislate that any "competitive" industry was subject to state price regulation became a question of whether the industry was "affected with a public interest," which concept was long used narrowly to construe the scope of the state police power in this field, since, if the court refused so to classify a business, state regulation of prices was held in violation of the Fourteenth Amendment. State regulation of the prices of both public utilities and quasi-public industries involves an overlapping of the state police power with both the interstate commerce power and the due process clause. We shall, therefore, consider these problems under the latter headings.

2. *The Interstate Commerce Power*

In Article I, Section 8, of the Constitution, Congress is given the power "To regulate commerce with foreign nations, and among the several states." The general right of Congress to regulate interstate railway rates under this power was not seriously questioned, constitutional points being raised only with regard to the Interstate Commerce Commission's powers in administering the act.[6] And by 1911, the Court had recognized the right of the I.C.C. to regulate purely intrastate rates as well, insofar as such regulation was

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[6] *I. C. C. v. Brimson*, 154 U. S. 447 (1894).

necessary or appropriate to effectuating its policy with regard to interstate rates.[7]

The Sherman Act did not escape so easily, its constitutionality being vigorously attacked as overstepping the bounds of the interstate commerce power. In the *Knight* case,[8] involving a combination controlling 98 percent of the nation's sugar refining facilities, a majority of the Court held that the record established the existence of a monopoly and restraint, not of interstate commerce, but of the manufacture of a necessity of life. "Commerce," said the court, "succeeds to manufacture, and is not a part of it." This distinction was necessary, so it was argued, in order to preserve the independence of the federal commerce power and state police power. For, if the Court recognized the right of the federal government to regulate such refineries, agriculture, mining, and other businesses of a strictly local nature could equally well be brought under federal control. The fact that the product was sold and distributed among the several states was dismissed on the grounds that "trade and commerce served manufacture to fulfill its function."[9]

In the *Swift* case[10] of 1904, however, the Court took a less extreme and far more practical view. Here the defendant meatpackers argued that the purchase of livestock and the sale of fresh meats were not shown to be in interstate commerce. Speaking through Justice Holmes, the Court replied:

"Commerce among the states is not a technical legal conception, but a practical one, drawn from the course of business. When cattle are sent for sale from a place in one state, with the expectation that they will end their transit after purchase in another, and when in effect they do so, with only the interruption necessary to find a purchaser at the stockyards, and when this is a typical, constantly recurring course the current thus existing is a current of commerce among the states, and the purchase of the cattle is a part and incidence of such commerce."

This decision was later hailed by the Court itself as "a milestone in the interpretation of the commerce clause of the Constitution. . . . It refused to permit local incidents of a great interstate movement, which taken alone were intrastate, to characterize the movement as such."[11] The *Board of Trade* case and *Stafford v.*

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[7] Beginning with *Southern Railway v. U. S.*, 222 U. S. 20 (1911).
[8] *U. S. v. E. C. Knight Co.*, 156 U. S. 1 (1895).
[9] Ibid., pp. 12–13, 16. But see Justice Harlan's scathing dissent (ibid., p. 19).
[10] *Swift and Co. v. U. S.*, 196 U. S. 375.
[11] *Board of Trade of Chicago v. Olsen*, 262 U. S. 1 (1923), upholding the Grain Futures Act of 1922.

Wallace,[12] based on the *Swift* case, recognized the right of the federal government to regulate activities and transactions, by use of the licensing power, on those markets that comprise the major machinery for interstate distribution of agricultural products.

In the *Schechter* case,[13] however, the Court veered back toward the narrow interpretation of the *Knight* case. In this decision, invalidating the NRA, the court ruled that local wholesale slaughter and marketing of poultry, even though shipped in from out of state, is not in and does not affect interstate commerce, the poultry having come to rest, and is thus beyond the power of Congress. The government's position, it was argued, would practically impose no limits on its power to regulate local affairs under the guise of regulating interstate commerce.

The labor cases of 1937–39,[14] however, practically reversed the *Schechter* decision, at least within the field of industrial relations. In the *Jones & Laughlin* case, federal regulation was held to be a valid exercise of the commerce power if the employer obtained his raw materials and/or sold his finished products outside of the state of manufacture, thus applying the flow concept of "commerce" first established in the *Swift* case. In the *Santa Cruz* decision, an employer buying his raw materials within the state and shipping only a third of his product out of the state was held subject to federal control, though the flow of commerce had not yet started at that point. Finally, in the *Fainblatt* case, it was held that the employer's relative volume of interstate and intrastate business was immaterial. On the basis of these decisions, an authority recently observed that the court has shown

"a distinct trend toward determining the existence of the appropriate connection between local activities and interstate commerce by accepting an organic view of the nature of our economic system. . . . [Therefore], the likelihood is very great that direct enactment of many of the rules for regulating competition that were found in the [NRA] codes [would now] be sustained for many businesses and activities that are neither interstate commerce nor a part of the current of such commerce."[15]

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[12] 258 U. S. 495 (1922), upholding the Packers and Stockyards Act of 1921.

[13] *Schechter Poultry Corp. v. U. S.*, 295 U. S. 495 (1935).

[14] Notably *N.L.R.B. v. Jones and Laughlin Steel Corporation*, 301 U. S. 1 (1937); *Santa Cruz Fruit Co. v. N.L.R.B.*, 303 U. S. 453 (1938); *N.L.R.B. v. Fainblatt*, 306 U. S. 601 (1939).

[15] Rottschaeffer, loc. cit., pp. 1150–51. Cf. his analysis (p. 1140) of *Mulford v. Smith* (307 U. S. 38, 1939), the decision of which he finds grants "practically unlimited" power to Congress to prohibit interstate commerce in agricultural (and presumably other) products by the use of marketing quotas.

3. *Fourteenth Amendment: Due Process of Law*

The efforts of states to regulate business price policies under the state police power have been largely circumscribed by judicial application of the Fourteenth Amendment, which provides that "nor shall any state deprive any person of life, liberty, or property, without due process of law." Since the term "person," at common law and apart from any statutory enactment limiting its meaning, includes both natural and artificial persons, it was early established that, so far as property rights are concerned, a private corporation is a person within the meaning of the provisions of the Fourteenth Amendment.[16] Here we may best classify the constitutional questions arising under the Fourteenth Amendment according to the three types of enterprise recognized by the courts—public utilities, quasi-public enterprises, and private "competitive" businesses.

A. *The Public Utility Question*

In 1890 the court ruled that the judiciary must be the final arbiter on the "reasonableness" of rates fixed by a state railway commission, thereby invalidating a Minnesota law, which explicitly sought to eliminate judicial inquiry, as violative of the due process clause of the Fourteenth Amendment.[17] The logical result of this decision was the unanimous opinion of *Smyth v. Ames*,[18] in which the court took it upon itself to substitute its own judgment *de novo* for that of presumably expert state commissions as to what rate, in each specific case, made possible "a fair return on a fair value." This became a constitutional question through the court's view that rates which did not meet its standards of reasonableness would be "confiscatory," thereby taking property without due process of law, and brought review of the facts as well as of procedural questions of law under its jurisdiction.[19]

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[16] 13 *Am Jur.*, Corporations, Sections 9–12. Cf. *Santa Clara Co. v. Southern Pacific Railroad*, 118 U. S. 394 (1885), where this fact was admitted by the court without argument.

[17] *Chicago, Milwaukee, and St. Paul Ry. Co. v. Minnesota*, 134 U. S. 418 (1890). In a dissent, Justice Bradley declared that this decision practically overruled *Munn v. Illinois* (see below, p. 562–563) and several railroad cases decided at the same time, the governing principle of [which] was that the regulation of the fares of railroads and other public accommodations is a legislative prerogative and not a judicial one." Justice Bradley's entire dissent is a striking attempt to self-impose relatively narrow limits upon the court's power of judicial review.

[18] 169 U. S. 466 (1897).

[19] Justice Bradley, in the *Milwaukee* case (cited in footnote 17 above) appears to have been right in his assertion that the court was, in effect, applying the clause in

In the rule of fair valuation laid down in this case, the court declared that

"the original cost of construction, the amount expended in permanent improvements, the amount and market value of its bonds and stock, the present as compared with the original cost of construction, the probable earning capacity of the property under particular rates prescribed by statute, and the sum required to meet operating expenses, are all matters for consideration, and are to be given such weight as may be just and right in each case."

Justice Brandeis later observed that this rule of rate-making "not only fails to furnish any applicable standard of judgment, but directs consideration of so many elements, that almost any result may be justified."[20] By this decision, according to a recent dissent by Justice Stone, the courts were "projected into the most spectacular undertaking imposed upon them in the history of English jurisprudence."[21] This became true largely because of the increasing divergence between original cost and reproduction cost. Not only did this result in a hopelessly temporary and unstable rate-base, in view of the constant fluctuations in the price level, but resulted in calculations resting on "assumptions based on things that never happened and . . . methods of construction and installation that have never been and never will be adopted by sane men."[22]

As an alternative, Justice Brandeis unsuccessfully urged upon the court "The adoption of the amount prudently invested as the rate base and the amount of the capital charge as the measure of the rate of return [thus giving] definiteness to those two factors involved in rate controversies which are now shifting and treacherous and which render the proceedings peculiarly burdensome and largely futile."[23] Actually, most utility valuations were compromises between original cost and reproduction cost, hence less than the latter maximum legal "fair value," in spite of which utilities have

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the Fifth Amendment forbidding the taking of private property for public use without just compensation. This clause, he argued, is prohibitory upon the federal government only and does not appear in the Fourteenth Amendment, questions of eminent domain by state governments being subject to state laws.

[20] *State of Missouri ex rel. Southwestern Bell Telephone Co. v. Public Service Commission of Missouri*, 262 U. S. 276 (1923).

[21] *West v. Chesapeake & Potomac Telephone Co. of Baltimore*, 295 U. S. 662 (1935), at 689.

[22] Justice Brandeis, dissenting in the *Southwestern Bell Telephone* case, at 298 (cited above, footnote 20).

[23] Ibid., at 306 et seq., where he presents the advantages of the prudent investment concept. (Cf. W. E. Mosher, and F. G. Crawford, Public Utility Regulation, New York, Harper, 1933, pp. 214–16.)

usually prospered. This would indicate that the fair value test has
no relation at all to the basic economic issue, namely, what mini-
mum of earning power is necessary to insure the continued success-
ful functioning of a utility enterprise.[24]

It is undoubtedly true that the court did, by such measures,
assure the development of adequate procedural safeguards by state
commissions. But so conservative has its position been that it also
served to make regulation so expensive, time-consuming, and in-
flexible as to render it futile and to discourage initiative and re-
sponsibility on the part of commission personnel.[25] There is little
doubt that the result was strongly to favor excessive rates by the
utilities at the expense of an insufficiently-protected public interest.
Although the doctrine of the *Nebbia* case[26] offers a possible basis
for abandoning the "mischievous formula" of *Smyth v. Ames*, new
vitality was needlessly given it in the recent *Edison Light* case,
according to Justice Frankfurter's concurring opinion (joined by
Justice Black), which promises to become in time the new judicial
attitude:

"Experience has made it overwhelmingly clear that *Smyth v. Ames* and the
uses to which it has been put represented an attempt to erect temporary
facts into legal absolutes. The determination of utility rates—what may
fairly be exacted from the public and what is adequate to enlist enterprise
—does not present questions of an essentially legal nature in the sense that
legal education and lawyers' learning afford peculiar competence for this
adjustment. These are matters for the application of whatever knowledge
economics and finance may bring to the practicalities of business enter-
prise. The only relevant function of law in dealing with this intersection of
government and enterprise is to secure observance of those procedural safe-
guards in the exercise of legislative powers which are the historical founda-
tions of due process."[27]

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[24] Paul G. Kauper, Wanted: A New Definition of the Rate Base, *Mich. Law Rev.*,
Vol. 37 (1939), p. 1209.

[25] For a review of the consequences of the court's uncompromising attitude on
rate cases, see Justice Brandeis' opinion in *St. Joseph Stockyards v. U. S.*, 298 U. S.
39 (1936), at 73–93; and Justice Black's dissent in *McCart v. Indianapolis Water Co.*,
302 U. S. 419 (1937) at 424–41. For the court's insistence on exercising "independent
judgment both as to law and facts," see *Ohio Valley Water Co. v. Ben Avon Borough*,
253 U. S. 287 (1920).

[26] *Nebbia v. New York*, 291 U. S. 502 (1934), reviewed below (p. 571).

[27] *Driscoll v. Edison Light and Power Co.*, 307 U. S. 104 (1939) at 122. Frankfurter
explicitly returned to the position of Justice Bradley in the *Milwaukee* case (above,
p. 566) of 50 years earlier. See also *Railway Commission of Texas v. Rowan & Nichols
Oil Co.*, 310 U. S. 573 (1940), in which, after hearing conflicting testimony of techni-
cal experts, the court threw up its hands at deciding the question, thereby accepting
the state commission's own conclusions.

B. *Businesses Affected with a Public Interest*

In the common law, certain occupations (including keepers of wharves, inns, cabs, ferries, and grist mills), regarded as exceptional, had been held as subject to special regulation as early as the seventeenth century. In *Munn v. Illinois*,[28] the court upheld an Illinois law fixing maximum charges for storage in thirty Chicago grain elevators, which allegedly had fixed charges annually by agreement. Counsel for the defense invoked the due process clause of the Fourteenth Amendment, insisting that it should be interpreted in light of the common law, which did not include grain elevators as a "business affected with a public interest."

Chief Justice Waite, in the majority opinion, accepted the legislation as a valid exercise of the state police power, especially in view of the monopolistic influences present in the business regulated, and made no distinction between price control and other forms of legislation. Though this would have been sufficient grounds for the opinion, he turned the tables on counsel for the elevators, by way of dictum, by using the "public interest" concept as the equivalent of the police power. This he did by generalizing the scope of the common law beyond those particular industries in which regulation had been upheld in the distant past. The fact that he felt it necessary to separate price-fixing from the other state police powers indicated "that the court was puzzled by a situation requiring public control of price because of the competitive restraints, yet not conforming to traditional notions of monopoly."[29]

Nevertheless, in line with the spirit of this decision, later courts extended the right of rate regulation to other grain elevators in Buffalo;[30] and, significantly, to those elevators scattered throughout the state of North Dakota,[31] thereby removing the necessity of finding monopoly in order to justify state price regulation. Regulation of Kansas fire insurance rates[32] and wartime rents in the District of Columbia[33] was subsequently held valid. The *Insurance*

[28] 94 U. S. 113 (1877).

[29] Robert W. Harbeson, The Public Interest Concept in Law and in Economics, 37 *Michigan Law Rev.* (1938), at 189. This article, an excellent detailed analysis of the judicial public-interest concept from an economic point of view, is heartily recommended. Cf. Walton H. Hamilton, Affectation with a Public Interest, 39 *Yale Law Journ.* 1089 (1930).

[30] *Budd v. N. Y.*, 143 U. S. 517 (1891).

[31] *Brass v. N. Dak.*, 153 U. S. 391 (1894).

[32] *German Alliance Ins. Co. v. Lewis*, 233 U. S. 389 (1914).

[33] *Block v. Hirsch*, 256 U. S. 135 (1921).

case, according to Harbeson, "disentangles public use from public utilities, [and] makes the concern of the business to the public the chief consideration."[34]

During the period 1923–32, however, a more conservative court seized upon the dictum of *Munn v. Illinois* as a constitutional principle narrowly restricting the scope of state price regulation under the police power. State regulation of the food, clothing, and fuel industries as affected with a public interest,[35] of extortionate charges by ticket brokers[36] and employment agencies,[37] of gasoline prices,[38] and of entry into the ice business,[39] was successively rejected. The majority found that these businesses were not within the (virtually) closed category of "businesses affected with a public interest" handed down by the common law. Hence, even where fraud or extortion existed, though business enterprises might be regulated under the state police power, state price regulation as a means of correction was specifically rejected as a restriction of private rights under the Fourteenth Amendment. This view reflects the court's conviction that, since there was not outright monopoly, public and private interests in the matter of price were adequately protected by the "competitive" market. So viewed, the court's dependence on that pillar of the judicial structure— "freedom of contract," in which price is the "heart of the bargain" —is apparent.

More realistically, Justice Stone stated in a dissent that "To me it seems . . . obvious that the Constitution does not require us to hold that a business subject to every other form of reasonable regulation, is immune from the requirement of reasonable prices, where that requirement is the only remedy appropriate to the evils encountered."[40] Where there was a combination of circumstances materially restricting the regulative force of competition, "so that buyers or sellers are placed at . . . a [serious] disadvantage in the bargaining struggle," he therefore saw no reason for limiting the use of the price-fixing power where that was appropriate.[41]

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[34] Harbeson, loc. cit., at 193–94.

[35] *Charles Wolff Packing Co. v. Court of Industrial Relations*, 262 U. S. 522 (1923).

[36] *Tyson v. Banton*, 273 U. S. 418 (1927).

[37] *Ribnik v. McBride*, 277 U. S. 350 (1928).

[38] *Williams v. Standard Oil Co.*, 278 U. S. 235 (1929).

[39] *New State Ice Co. v. Liebmann* 285 U. S. 263 (1932). This case is especially notable because it sets forth most fully the constitutional arguments for and against the validity of limitations on economic "liberty" as opposed to limitations on "property," with which we are principally concerned here. (But cf. below, pp. 574–575.)

[40] *Ribnik v. McBride*, loc. cit., at 373–74.

[41] *Tyson v. Banton*, loc. cit., at 451–52.

In 1934, Justice Stone's interpretation became the majority opinion in the epoch-making *Nebbia* case.[42] Here the court practically abandoned the "public interest" concept as it had served narrowly to restrict the extension of price regulation under the state police power. In so doing, it wrote into the law a clear recognition of the inadequacies of its former mutually-exclusive categories of "monopoly" and "competition" as covering the bulk of industrial enterprise. The *Nebbia* case involved the right of the State of New York to fix minimum prices at which dealers could sell milk. In the majority opinion, Justice Roberts argued that there is "no closed category of businesses affected with a public interest"; that the "public interest" concept meant no more than that an industry, for adequate reason, is subject to control for the public good; that the courts could not interfere on the ground of violation of due process so long as the laws have "a reasonable relation to a proper legislative purpose and are neither arbitrary nor discriminatory"; and that "the Constitution does not secure to any one liberty to conduct his business in such fashion as to inflict injury to the public at large or any substantial group of people."

The opinion explicitly recognized the implication toward competition upon which it was based:

"The law bodies have in the past endeavored to promote free competition by laws aimed at trusts and monopolies. The consequent interference with private property and freedom of contract has not availed the courts to set these enactments aside as violating due process. . . . If the law-making body within its sphere of government concludes that the conditions or practices in an industry make unrestricted competition an inadequate safeguard of the consumer's interest, produce waste harmful to the public, threaten ultimately to cut off the supply of a commodity needed by the public, or portend the destruction of the industry itself, appropriate statutes passed in an honest effort to correct the threatened circumstances may not be set aside because the regulation adopted fixes prices reasonably deemed by the legislature to be fair to those engaged in the industry and to the consuming public. And this is especially true where, as here, the economic maladjustment is one of price, which threatens harm to the producer at one end of the series and the consumer at the other."

On the basis of this decision, the court in *Olsen v. Nebraska*,[43] upheld a Nebraska law regulating the fees of private employment agencies, thereby reversing the similar case of *Ribnik v. McBride*.

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[42] *Nebbia v. N. Y.*, 291 U. S. 502 (1934), in a 5–4 decision.
[43] 61 Sup. Ct. 862 (1941).

But the *Nebbia* case also has another important economic implica-cation, which has not been sufficiently recognized. Whereas meas-ures of price control which earlier courts rejected were clearly in the interest of protecting the consumer or worker (ticket brokerage, employment agency fees, and the like), the tendency in recent years has been to use price-fixing as a means of protecting industry from "cut-throat competition." Such legislation has been promoted by special-interest groups from business and agriculture, with pro-tection of the consumer interest sometimes a political rationaliza-tion rather than basic fact. That most recent cases, beginning with the *Nebbia* case, have been concerned with the fixing of *minimum*, not maximum, prices to consumers should not be overlooked.[44] The vital shift of emphasis from preventing monopolistic extor-tion to preventing "cut-throat" competition simply reflects the dis-advantages which lack of an organized consumer movement entails in this day of national tugs-of-war. Nevertheless, it is the legislative rather than judicial branch which should be responsible for the social wisdom of legislation of this character.

C. *State Anti-Trust Action*

Since the federal government entered the anti-trust field in 1890, court actions involving constitutional questions as to the applica-tion of state anti-trust laws have been few and far between.[45] As an exception, we might mention *International Harvester v. Ken-tucky*.[46] Here a company was convicted under Kentucky statutes for a combination with competitors for enhancing the prices of farm implements above their "real value," i.e., their "market value under fair competition and under normal market conditions." Appealing to the Supreme Court, company counsel pleaded viola-tion of its rights under the Fourteenth Amendment, arguing that "the law as construed offers no standard of conduct that it is possible to know."

In an opinion delivered by Justice Holmes, the constitutional question was admitted as relevant:

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[44] For example, *Board of Barber Examiners v. Parker*, 182 So. 485 (1938) and *Miami Laundry Co. v. Florida Dry Cleaning Board*, 183 So. 759 (1938), in which questions of the "little NRA" type have arisen.

[45] For a survey of state anti-trust laws and their application, see Henry R. Seager, and Chas. A. Gulick, Jr., Trust and Corporation Problems, New York, Harper's, 1929, pp. 339–66. Prior to 1890, at least 14 states had anti-trust prohibi-tions in their state constitutions and at least 13 had statutory prohibitions (ibid., pp. 341–42).

[46] 234 U. S. 216 (1914).

"For it shows how impossible it is to think away the principal facts of the case as it exists and say what would have been the price in any imaginary world. Value is . . . a fact and is more or less easy to ascertain. But what it would be . . . had the combination not been made, with exclusion of the actual effect of other abnormal influences . . . is a problem which no human ingenuity can solve . . . the elements necessary to determine the imaginary ideal are uncertain both in nature and degree of effect to the acutest commercial mind. . . . In our opinion the law cannot stand."

This opinion suggests with what impatience a court might reject economic analyses of the results of imperfectly-competitive price policies, were it so inclined. This recognition should be a challenge to economists to develop more adequate and workable criteria of economically-undesirable market behavior than our present theoretical tools yet provide.[47]

One other recent case, *Tigner v. Texas*,[48] should probably be mentioned here. Wholesalers of beer were convicted under the Texas anti-trust law of a conspiracy to fix retail prices. Admitting the conspiracy, the wholesalers attacked the Texas statute on the grounds that, by providing criminal penalties for industrial organizations and only civil penalties for agricultural organizations, the law violated that part of the Fourteenth Amendment which provides that "nor shall any state . . . deny to any person within its jurisdiction the equal protection of the laws." This contention the court denied, arguing that the exemption of agricultural organizations from criminal penalty was justified by farmers' lack of economic power.

4. *The Fifth Amendment:*
Freedom of Contract and "Reasonable" Law

In this and the following section we are concerned with that part of the Fifth Amendment which provides that "nor shall any person be deprived of life, liberty, or property, without due process of law; nor shall private property be taken for public use without just compensation." Like the Fourteenth Amendment,[49] it has long been held that, so far as property rights are concerned, a private corporation is a "person" within the meaning of the terms of the Fifth Amendment, apart from any statutory enactment limiting

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[47] Cf. E. S. Mason, Monopoly in Law and Economics, 47 *Yale Law Journ.* (1937), espec. at 48–49.

[48] 310 U. S. 141 (1940).

[49] Cf. above p. 566.

its meaning.[50] Judicial application of the due process clause of the Fifth Amendment has proved a much more formidable barrier to federal social legislation than has judicial interpretation of the commerce clause. We shall consider the due process clause under two headings here: freedom of contract and "reasonable" law.[51]

A. *Freedom of Contract and Governmental Price-Fixing*

One of the most important principles of the Anglo-American common law has been the idea of "freedom of contract." Stemming from Roman law, this idea was sanctified and absolutized by eighteenth-century doctrines of natural rights. "As a theory of rights based on a social compact, [these doctrines] thought of natural rights as the rights of individuals who had entered into a contract, apart from which there would and could be no law and nothing for the law to maintain . . . [such] doctrines [sought to] protect those individuals against society for fear society [would] oppress them."[52]

Within the field of federal regulation of business price policies, however, "freedom of contract" did not stand its ground so well as in the field of labor legislation. More specifically, attacks on the Sherman Act on grounds of violation of "freedom of contract," although this concept was judicially interpreted as part of the meaning of "liberty" in the due process amendments, largely failed. The first effort to invalidate the Sherman Act along such lines was the *Joint Traffic* case,[53] involving a combination of railroads. Here, defense counsel argued that "the citizen is deprived of his liberty without due process of law when, by a general statute, he is arbitrarily deprived of the right to make a contract of the nature herein involved." They pointed to the recent decision of *Allgeyer v. Louisiana.*[54] In this case the Court declared that the word "liberty"

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[50] 13 *Am. Jur.*, Corporations, Sects. 9–12.

[51] Space will not permit treatment of a third and exceedingly important application of this clause of the Fifth Amendment. This is what has been termed *procedural* due process, about which the Courts have evolved an elaborate set of rules governing the "quasi-judicial" activities of regulatory commissions in carrying out policies substantially affecting private rights and duties. During the past decade, the rise of myriad commissions and regulatory agencies has given marked impetus to the development of "administrative law," which seeks to solve the conflict between the needs of effective enforcement of public policies and the avoidance of arbitrary denial of private rights. The writer hopes to discuss the complicated subject in a separate article elsewhere.

[52] Pound, op. cit., pp. 100, 102–03.

[53] *U. S. v. Joint Traffic Assn.*, 171 U. S. 505 (1898).

[54] 165 U. S. 578 (1897). It was later held (*Western Turf Assn. v. Greenberg*, 204 U. S. 359) that "The liberty guaranteed by the Fourteenth Amendment against deprivation without due process of law is the liberty of natural, not artificial, persons." Cf. *New Ice Co.* case, cited in footnote 39 above.

as used in the Fourteenth Amendment included "the liberty of the citizen to pursue any livelihood or vocation, and for that purpose to enter into all contracts which might be proper, necessary, and essential to the carrying of these objectives to a successful conclusion." The Court replied,

"We presume that it will not be contended that the court meant, in stating the right of the citizen 'to pursue any livelihood or vocation' to include every means of obtaining a livelihood, whether it was lawful or otherwise. . . . Notwithstanding the general liberty of the citizen under the Constitution, we find that there are many kinds of contracts which, while not in themselves immoral or *mala per se*, may yet be prohibited by the legislature of the states or, in certain cases, by Congress."

In the *Addyston* case,[55] counsel for the defendants argued that the commerce clause of the Constitution does not give Congress "the general power to interfere with or prohibit private contracts between citizens even though such contracts have interstate commerce for their object and result in a direct and substantial obstruction to or regulation of that trade." To this audacious proposal, the court replied:

"On the contrary, we think the provision regarding the liberty of the citizen is, to some extent, limited by the commerce clause of the Constitution, and that the power of Congress to regulate interstate trade comprises the right to enact a law prohibiting the citizen from entering into those contracts which directly and substantially, and not merely indirectly, remotely, incidentally, and collaterally regulate to a greater or less degree commerce among the states."

To clinch its point, the court quoted the *Debs* case:[56] "If a state, with its recognized power of sovereignty, is impotent to obstruct interstate commerce, can it be that any mere voluntary association within the limits of the state has a power which the state itself does not possess?" Thus this case clearly and conclusively established that private contracts could not prevail against the national power in enforcing the Sherman Act. But the end was not yet. For the word "contract" in the Sherman Act was soon to become the basis for the "rule of reason," declaring the necessity for distinguishing between those contracts which were in "reasonable," and those which were in "unreasonable," restraint of trade.[57]

After the turn of the century, the "liberty" aspect of the due process clauses was long used to place narrow limits on the rights

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[55] *Addyston Pipe and Steel Co. v. U. S.*, 175 U. S. 211 (1899).
[56] *In re Debs*, 158 U. S. 564 (1895).
[57] Considered in the next section below.

of the states to effectuate labor legislation of various sorts. These cases, therefore, involved primarily application of the Fourteenth Amendment.[58] In recent years, however, notably in federal intervention in the major milk markets, state price-fixing laws, passed to implement federal control, have been upheld. Beginning with the *Nebbia* case,[59] other New York statutes fixing milk prices, spreads, and differentials were held valid by the court.[60] And, in 1939, the court indirectly allowed the federal government to fix intrastate milk prices whenever it effectuates the policy under the commerce power, and recognized as well its power to fix milk prices in interstate trade.[61]

The due process clause of the Fifth Amendment did not figure directly in these cases, but Congress, in exercising its authority under the commerce power, must do so in a manner consistent with that clause in the Fifth Amendment.[62] Nevertheless, these decisions infer that, since the *Nebbia* case, this clause is not a very serious limitation upon federal price-fixing, either for agricultural products or for other products in which a "public interest" can be shown.[63]

B. *"Reasonable" Law*

The Sherman Act was yet young when the court was urged to hold that the Sherman Act excepted contracts which were not in "unreasonable" restraint of trade. The majority of the court in the *Trans-Missouri* case,[64] however, explicitly rejected this view:

" . . . we are asked to read into the act by way of judicial legislation an exception that is not placed there by the law-making branch of the government, and this is to be done on the theory that the impolicy of such legislation is so clear that it cannot be supposed Congress intended the natural import of the language it used. This we cannot and ought not to do. . . . If the act ought to be read as contended by defendants, Congress is the body to amend it and not this court, by a process of judicial legislation wholly unjustifiable."

[58] See, for example, *Adkins v. Children's Hospital*, 261 U. S. 525 (1923), where minimum wage laws for women were held as depriving both employer and employee of their liberty and property without due process of law. This decision was effectively reversed in *West Coast Hotel Co. v. Parrish*, 300 U. S. 379 (1937).

[59] Cited in footnote 42, above.

[60] *Hegeman Farms Corp. v. Baldwin*, 293 U. S. 163 (1934); and *Borden Farm Products Co. v. Ten Eyck*, 297 U. S. 251 (1936).

[61] *U. S. v. Rock Royal Cooperative*, 307 U. S. 533 (1939).

[62] *Virginia Railway v. System Federation No. 40*, 300 U. S. 515 (1937).

[63] Rottschaeffer, loc. cit., at 1156–57.

[64] *U. S. v. Trans-Missouri Freight Assn.*, 166 U. S. 290 (1897).

The seeds of revolt were, however, already apparent in the dissenting opinion of Justice White, who submitted that the Sherman Act had not intended to ban "every contract in restraint of trade," but, as the title itself proved, only "unlawful restraints." The legal test thus invoked, he continued, was that of the common law by which, at least in recent times, "if a contract was reasonable it would not be held to be included with contracts in restraint of trade."

In the *Joint Traffic* case,[65] defendants' counsel argued that, even if their contract affected interstate commerce, it was only a "reasonable" restraint against ruinous competition and was formed only to protect the parties thereto in securing prices for their product that were fair and reasonable (in a nice contradiction of terms) to themselves and to the public. To this claim the court replied that, at common law, no question of reasonableness was open to the courts with reference to such a contract; that "its tendency was certainly to give defendants the power to charge unreasonable prices, had they chosen to do so"; and that, regardless, the facts showed conclusively that prices were enhanced unreasonably.

In the *Northern Securities* case,[66] the "rule of reason" won a new convert in Justice Brewster who, while concurring, held that the Act "did not intend to destroy those minor contracts in partial restraint of trade which common law would hold reasonable." And Justice Holmes, in a strong dissent, asserted that

"if the restraint on the freedom of the members of a combination caused by their entering into a partnership is a restraint of trade, every such combination, as well the small as the great, is within the Act. . . . I am happy to know that only a minority of my brethren adopt an interpretation of the law which in my opinion would make eternal the *bellum omnium contra omnes* and disintegrate society so far as it could into individual atoms."

By 1911 the tenacious adherence of Justice White to his "reasonable" point of view—first formulated 14 years earlier—had brought sufficient converts to make it the majority view of the court. It was in that year that the "rule of reason" was laid down in the *Standard Oil* case.[67] Justice White, speaking for the majority, argued that Section 1 of the Act—declaring illegal "every contract, combination

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[65] Cited above, footnote 53.
[66] *Northern Securities Co. v. U. S.*, 193 U. S. 197 (1903).
[67] *Standard Oil Co. of N. J. v. U. S.*, 221 U. S. 1 (1911).

in the form of trust or otherwise, or conspiracy in restraint of trade or commerce"—was made so broad to insure that no form of contract or combination, old or new, by which an "*undue* restraint of trade" might be effected, could escape condemnation. However, the contracts or acts embraced in the provision, not being expressly defined, were so broad as "to embrace every conceivable contract or combination which could be made concerning trade or commerce." Therefore, "it inevitably follows that some standard should be resorted to for the purpose of determining whether the prohibitions contained in the statute had or had not in any given case been violated. Thus not specifying but indubitably contemplating and requiring a standard it follows that it was intended that the standard of reason which had been applied at the common law . . . was intended to be the measure used."

Having by the first section forbidden all means of monopolizing trade, Section 2 of the act is supplemental thereto, seeking, if possible, "to make the prohibitions of the act all the more complete and perfect by embracing all attempts to reach the end prohibited by the first section, that is restraints of trade, by any attempt to monopolize, or monopolization thereof . . . ." By so harmonizing these two sections of the act, it becomes obvious that "the criteria to be resorted to in any given case for the purpose of ascertaining whether violations of the section have been committed, is the rule of reason, guided by the established law and by the plain duty to enforce the prohibitions of the act and thus the public policy which its restrictions were obviously enacted to subserve." The importance of the notion of "freedom of contract" is shown by the observation that such a reading of the law indicates "a consciousness that the freedom of the individual right to contract when not unduly or improperly exercised was the most efficient means for the prevention of monopoly." Read in this way, the act did not conflict with the Fifth Amendment but supported it.

By translating "*every* contract in restraint of trade" into "every contract in *undue* restraint of trade," it appears plain that, as Justice Harlan argued in his dissent, the Court took as the ultimate standard of the "rule of reason" its own view, in each individual case, of sound public policy, thereby engaging in "judicial legislation."[68] It was partly fear that the court had thereby established

[68] For an extensive criticism of Justice White's legal reasoning, see E. S. Corwin, The Anti-Trust Laws and the Constitution, 18 *Virginia Law Rev.* (1932), at 362–64

a sort of economic dictatorship of the country that led to the passage of the Clayton and Federal Trade Commission Acts in 1914. Suffice it to say here that the Trade Commission, due to a variety of causes, failed to live up to its expectations, so that the principal anti-trust cases have continued to be brought by the Department of Justice as in the years previous to 1914.

It will be impossible to review the judicial application of the "rule of reason" to these cases individually and, besides, further constitutional questions have not arisen. Through the thirty-year reign of the "rule of reason," however, the following brief summary of the results of its application may be helpful. (1) Patent control may not be used to maintain the resale price structure or control of firms beyond the original patentee.[69] Only revision of the patent laws themselves would reach most monopolies built on patents, however. (2) As a result of the *Steel* case, there is no legal limit to the size a firm may attain by merger, if methods used are not overtly restrictive of entry or growth of competitors.[70] It is this aspect of judicial application which has narrowly limited the effectiveness of the anti-trust laws in the more subtle forms which monopoly has taken during the past quarter-century.[71]

Toward loose combinations, such as trade associations, application of the anti-trust acts has been much more severe than to close combinations, such as mergers. Thus, the Court has held (3) that trade associations may not use methods of boycott to maintain traditional channels of distribution.[72] On the other hand, the Court's initial ban on the exchange and discussion of statistical information through trade associations was later modified out of fear that its earlier stand might of itself bring about mergers. Therefore, (4) it now holds that such activities are legal so long as there is no "necessary tendency" toward unreasonably high prices,

and 367–70. Especially interesting is his emphasis (p. 369) upon the decision's studied avoidance of the word "conspiracy" in the act in favor of "contract," the former having a much more potent meaning in the common law.

[69] *United Shoe Machinery Co. v. U. S.*, 258 U. S. 451 (1922), where it was held that "the patent right confers no privilege to make contracts in themselves illegal," thereby rejecting the company's claim of taking property, secured to them by grant of the patent, without due process of law; *Ethyl Gasoline Corp. v. U. S.*, 309 U. S. 436 (1940).

[70] *U. S. v. U. S. Steel Corp.*, 251 U. S. 407 (1920); *U. S. v. International Harvester Co.*, 274 U. S. 693 (1927).

[71] See Mason, loc. cit., and Corwin Edwards, Can the Anti-Trust Laws Preserve Competition?, *Amer. Econ. Rev.*, Supplement, Vol. 30 (1940), espec. pp. 175–77.

[72] *Eastern States Retail Lbr. Assn. v. U. S.*, 234 U. S. 600 (1914); cf. *U. S. v. Amer. Medical Assn.*, 110 F. (2d) 703 (1940).

and no agreement to fix prices or limit production.[73] Finally, (5) if the existence of more or less formal price agreements is clearly established, the Court has ruled that such agreements are illegal *per se*.[74]

In the writer's opinion, some "rule of reason" was essential to the application of the anti-trust laws, especially after 1915, but it is highly questionable whether the courts could be expected to develop criteria which would furnish an adequate basis for determining the social desirability of specific situations. It was undoubtedly in this belief that Congress has increasingly resorted to the creation of independent regulatory commissions, which were expected to develop specialized knowledge and adequate criteria for administering and effectuating public policy in the field of social legislation.

Traditionally, the Court has shown the tendency, by exercise of judicial review, to subject new federal commissions to "trial by ordeal," in an attempt to bring their procedures and findings of fact up to a high standard of fairness and accuracy.[75] The relations between the commissions and the Court is an extensive subject in itself.[76] Suffice it to say here that the past decade has seen a far-reaching revival of judicial self-restraint toward federal commissions, by which the Court has shifted much of the responsibility for policy-making to the legislative and executive branches of the government.

At the same time, it has shifted the focus of constitutional limitations from legislation to administration. At last recognizing the basic necessity for administrative regulatory agencies, the Court is now giving increasing attention to the internal procedures of such agencies. Its major and difficult problem, for the immediate future, is to find a satisfactory compromise between protecting the indi-

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[73] *Amer. Column and Lbr. Co. v. U. S.*, 257 U. S. 402 (1921); *U. S. v. Amer. Linseed Oil Co.*, 262 U. S. 371 (1923); *Maple Flooring Mfrs. Assn. v. U. S.* 268 U. S. 563 (1925); *Cement Mfrs. Protective Assn. v. U. S.*, 268 U. S. 588 (1925). The last two cases rather effectively reversed the first two.

[74] *U. S. v. Trenton Potteries Co.*, 273 U. S. 392 (1927); *Appalachian Coals, Inc. v. U. S.*, 288 U. S. 344 (1933), notable for the fact that the Court here, after an economic analysis of the effects of the agreement in question, upheld it; *Sugar Institute v. U. S.*, 297 U. S. 553 (1936); and *U. S. v. Socony-Vacuum Oil Co.*, 310 U. S. 150 (1940), which contains a fine survey of the Court's application of the law to price agreements.

[75] For an excellent analysis of the differences in the degree of success which the F.T.C. and I.C.C. have enjoyed in their relations with the courts, see Merle Fainsod, Some Reflections on the Nature of the Regulatory Process, (Mason and Friedrich, editors), Harvard University Press, 1940, pp. 321–22.

[76] Cf. footnote 51 above.

vidual from the abuse of administrative discretion and giving sufficient scope to administrators for the effective exercise of their manifold and essential duties.

5. *Summary and Conclusions*

We began by pointing out the strong individualist slant which Anglo-American common law has inherited from the past. Through our survey of the trends in judicial interpretations of the Constitution during the past half-century, it should be obvious that the Court abandoned this position of thorough-going individualism for one of a broader social outlook only with great reluctance. In fact, it was not until the trying times of the past decade that the Court altered its position so fundamentally as to bring about what some have called a "constitutional revolution." As a result of this sharp and striking break with the past, it may be well to summarize the principal judicial attitudes toward governmental regulation of business price policies which currently hold.

(1) The interstate commerce clause is no longer a barrier to the extension of federal regulation to what the courts once regarded as strictly local activities, subject to the sole jurisdiction of the states. This follows since the courts have now adopted the view that the nation's *economic* system is a single inter-related organism, impossible of easy and clear-cut separation into state and federal categories.

(2) The courts still remain the final arbiters on the "reasonableness" of public utility rates as fixed by the state utility commissions. The impasse which has resulted still awaits a solution, since the Court has not yet overthrown the valuation doctrine of *Smyth v. Ames*. Such an overthrow in the near future, accompanied by increasing judicial deference toward the findings (*including* the valuations) of the state commissions, is not unlikely. The probable alternatives are the further extension of federal regulation and public ownership in this field.

(3) With the *Nebbia* case, the Court practically abandoned the "public interest" concept as a basis for narrowly restricting the extension of governmental price regulation as a tool of the state (and federal) police power. In this regard, the Court has strengthened the state police power immeasurably, and has largely abandoned the futile attempt to divide industry into the two clear-cut divisions of "monopolistic" and "competitive."

(4) That major tenet of the common law, "freedom of contract,"

so long subsumed under constitutional due process, has lost much
of its former potency as a barrier to state and federal price-fixing
as a result of the *Nebbia* decision and subsequent rulings. No longer
is the Court so confident that the public interest is adequately pro-
tected by the free workings of what they once unequivocally called
the "competitive" market. Unfortunately, however, the effect thus
far has been to give freer rein to legislation fixing prices in favor of
special-interest groups rather than in favor of the general social
interest.

(5) The "rule of reason" still remains the judicial standard in
federal anti-trust proceedings. As applied to loose combinations,
judicial discretion has not been notably misused. The law on close
combinations still remains in a most unsatisfactory state, however,
largely a result of the failure of continued Congressional action in
this important and perplexing field.

We may conclude that the courts have recently laid the founda-
tion for far-reacing public control of business price policies. In the
writer's opinion, the courts have been fully warranted, and only too
belated, in taking their new position. Nevertheless, he is fool-
hardy who fails to see the implications of this shift of attitude by
the Court. First, there is a prime necessity for the development of
greater social responsibility, genuine objectivity, and specialized
knowledge on the part of both the administrative and legislative
branches of government. Second, if economics is to contribute any-
thing constructive, it must develop workable criteria of imperfect
competition, by which socially-desirable and socially-undesirable
business price policies may be more clearly distinguished. And,
finally, Congress and the electorate must recognize how vital is dis-
criminating alertness, on their part, to both administrative excesses
and the false charges of interested parties bent on sabotaging essen-
tial regulatory activities.

CROP YIELD INDEX NUMBERS[1]

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IN THE November 1940 issue of this JOURNAL E. J. Working presented a critical analysis of various crop yield index numbers. That paper furnished the background for a study the main results of which are presented here. Working's most important findings are examined in the first five sections of the article and the last two sections are devoted to an analysis of problems which he did not mention.

A crop yield index number expresses the average of the yields of various crops on a farm or in a locality relative to the yields of the same crops on another farm or in a second locality. The most important use of such an index number is made in the factor analysis of farm businesses, where it is one of several management factors that influence earnings. Crop yield index numbers may be used in land classification and in tenure studies. They may be employed to express either spatial or temporal average differences in crop yields for regions, states, or countries. They may be constructed for certain kinds of crops only or for all crops.

It should be kept in mind that a measure of yield measures output only; it gives no information on inputs. Therefore, it is no productivity measure, i.e. it does not measure the inherent ability of land to produce.

The most widely used formula for the calculation of crop yield index numbers may be designated algebraically in the following way:

$$\frac{\sum \left(\frac{y_1}{y_0} \cdot a_1 \right)}{\sum a_1} \tag{1}$$

where y_1 = given yield, y_0 = base yield, and a_1 = given acreage. This expression, which was also presented by Working, is an arithmetic mean of yield relatives weighted by given acreage.

According to Working, this index has an inherent upward bias. When the comparison is reversed, with the base yields expressed

relative to given yields, the magnitude of such a reversed index is larger than the reciprocal of the original index. Consequently, the product of the original and the reversed indices exceeds unity (or 100 percent). Working presented a numerical illustration in which the index of given yields relative to the base amounted to 125; the index of base yields relative to given yields was also 125, a magnitude which seems to express an inconsistency. This problem will be examined in the following section.

1. *Base Reversal Test and "Upward Bias"*

If a given yield amounts to 80 percent of the base yield, the base yield amounts to 125 percent of the given yield. The product of these two figures is unity. Algebraically this may be written $(y_1/y_0) \cdot (y_0/y_1) = 1$. The base reversal test demands that an index number must act like a single relative in this respect. If the behavior of an index number formula with regard to this test is to be examined, it will be found that there are three methods by which the original formula may be reversed.

The weight, designated as a_1 in formula (1) may be treated as a constant as in Fisher's formula number 9001.[2] The reversal of the original formula becomes thus:

$$\frac{\sum \left(\dfrac{y_0}{y_1} \cdot a_1 \right)}{\sum a_1} \tag{1a}$$

Working seems to have reversed his original index according to this formula. It is the reciprocal of a harmonic mean of yield relatives weighted by given acreage. Since a harmonic mean is always smaller than the corresponding arithmetic mean, the reciprocal of a harmonic mean exceeds the reciprocal of the arithmetic mean. Thus, the product of the original index and this type of a reversed index must necessarily exceed unity. The amount by which this product exceeds 100 percent has been called the joint upward bias of forward and reversed indices by some index number methodologists. A numerical illustration will help to clarify the procedure.

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[2] Irving Fisher. The Making of Index Numbers. Houghton Mifflin Co., Boston (etc.) 1922. p. 487.

The following basic data are assumed:

Crop	Given yield (y_1)	Base yield (y_0)	Given acreage (a_1)	Base acreage (a_0)
	tons	tons		
Soybean hay	1.50	1.00	1	4
Timothy hay	.50	1.00	1	1

The original index is

$$\frac{\dfrac{1.50}{1.00} \times 1 + \dfrac{.50}{1.00} \times 1}{2} = 100 \text{ percent}$$

The reversal (1a), in which only the yield data are reversed while the original acreages are used at the same time, amounts to

$$\frac{\dfrac{1.00}{1.50} \times 1 + \dfrac{1.00}{.50} \times 1}{2} = 133 \text{ percent}$$

The product of 100 and 133 seems to exhibit a joint upward bias of 33 percent. The original index (1) states that growing 1.5 tons of soybean hay and 0.5 ton of timothy requires the same area with given and with base yields.[3] The reversal (1a) states that growing 1 ton of each crop will require 2 acres with base yields but $2\frac{2}{3}$ acres with given yields. The original index and this reversal differ, because they represent two different combinations of crop production or crop composites. A crop composite may be visualized as a granary and a barn filled with certain quantities of crops. This is a concept analogous to that of the market basket used in price indices. In order to produce the same composite of crops as the base the given farm would require more land. However, by changing the composite the given farm can produce the same total tonnage as the base. With the base it does not matter whether a composite of 1 ton of soybean hay and 1 ton of timothy or a composite of 1.5 tons and 0.5 ton is desired. Either composite can be produced on 2 acres. On the basis of one comparison the land of the given farm yields as much as the base. According to the other comparison the base has yields that are 133 percent of the given yields. These two comparisons can exist side by side. Both are correct. The given farm has a higher yield of soybean hay, while the base obtains a higher yield of timothy. If still another composite of these two crops is to

[3] The following explanation is based on Gottfried Haberler. Der Sinn der Index-zahlen. Mohr, Tübingen 1927. pp. 17 f.

be produced, say 4 tons of soybean hay and 1 ton of timothy, the given farm will have an advantage over the base.

In the second reversal all subscripts including that of the weight are reversed. This method follows Fisher's practice of exchanging *all* subscripts in the formula.[4] Thus the reversed index becomes

$$\frac{\sum \left(\frac{y_0}{y_1} \cdot a_0 \right)}{\sum a_0} \tag{1b}$$

This formula would represent Working's reversal, if he assumed identical acreages for his given and for his base farm. The product of the original formula and this second reversal may exceed, equal, or amount to less than unity depending on the differences between given acreages (a_1) and base acreages (a_0). Thus, this second reversal will not result in fulfillment of the base reversal test except as a rare coincidence. Since the product of original and reversed indices may be more *or* less than unity, it is not possible to talk of a bias in connection with this reversal.

Using the data of the above numerical illustration the second reversal amounts to

$$\frac{\frac{1.00}{1.50} \times 4 + \frac{1.00}{.50} \times 1}{5} = 93 \text{ percent}$$

The product of 100 and 93 is less than 100 percent. If the base acreage of soybean hay were 3 rather than 4, the reversed index would amount to 100. If it were less than 3, the reversed index would exceed 100.

Finally, there is a third method to reverse the original formula. This reversal may be calculated, if the original formula is written as an aggregative rather than as a weighted mean of relatives.

$$\frac{\sum \left(\frac{y_1}{y_0} \cdot a_1 \right)}{\sum a_1} = \frac{\sum \left(\frac{y_1 a_1}{y_0} \right)}{\sum \left(\frac{y_1 a_1}{y_1} \right)} \tag{1}$$

The second expression is equal to the first, since the two y_1 symbols in the denominator cancel against each other. The product $y_1 a_1$ in this expression designates the production of a crop. This magnitude

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[4] Fisher, op. cit. pp. 118 f.

cannot be summed for various crops, since bushels or pounds of grain cannot be added to tons of hay. However, if each of these products is divided by a yield figure, the acreage required to obtain the product $y_1 a_1$ is obtained. The acreage figures lend themselves to summing. Thus, the formula is the ratio of the acreage required to obtain the production composite of the given farm with base yields to the actual acreage of the given farm.

Working mentioned that the usual crop yield index may be regarded as a ratio of acreage aggregates; furthermore, he calculated his numerical examples according to the aggregative version of formula (1); but, he failed to use it as a starting point for the base reversal test. If this is done, the following reversal is obtained:

$$\frac{\sum \left(\frac{y_1 a_1}{y_1}\right)}{\sum \left(\frac{y_1 a_1}{y_0}\right)} \tag{1c}$$

Instead of computing the ratio of the acreage required to raise this constant production composite with base yields to the given acreage, the index has been reversed to express the ratio of the given acreage to the acreage required to raise the production composite with average yields.

$$\frac{\sum \left(\frac{y_1 a_1}{y_0}\right)}{\sum \left(\frac{y_1 a_1}{y_1}\right)} \cdot \frac{\sum \left(\frac{y_1 a_1}{y_1}\right)}{\sum \left(\frac{y_1 a_1}{y_0}\right)} = 1 \tag{1 $\times$ 1c}$$

Here the base reversal test is fulfilled. It will be remembered that the numerical illustration of the original index showed an index of 100. If this index is reversed according to the third method (1c), the following values are obtained:

$$\frac{\dfrac{1.50 \times 1}{1.50} + \dfrac{.50 \times 1}{.50}}{\dfrac{1.50 \times 1}{1.00} + \dfrac{.50 \times 1}{1.00}} = 100 \text{ percent}$$

If the original index has any other value than 100, the reversal according to this method will always be the reciprocal of the original index.

The reader who wishes to go back to the numerical illustrations

presented by Working will find the original index (1) in Table 1 of
his article. The first reversal (1a) is found in Table 2. The original
crop yield index number states that with base yields 125 percent as
much land as with given yields would be required to produce a com-
posite of 9,600 bushels of corn, 400 bushels of wheat, and 800 bushels
of oats. The index in Table 2 states that with given yields 125 per-
cent as much land as with base yields would be required to produce
a composite of 4,800 bushels of corn, 800 bushels of wheat, and 1,600
bushels of oats. These two comparisons are not inconsistent; they
are made with respect to two different production composites. The
given farm has an advantage in the production of corn, the base
farm in the production of wheat and oats. However, if the first com-
parison were reversed with the production composite held constant,
it would be obvious that with given yields 80 percent as much land
as with base yields would be required to produce 9,600 bushels of
corn, 400 bushels of wheat, and 800 bushels of oats. Table 3 of
Working's article illustrates the second way to reverse the original
index (1b). Since the acreages planted to the same crops in various
years have apparently been similar, all index numbers shown seem
to exhibit an upward bias. In the case of his own numerical illustra-
tion of the second reversal the author has shown that such a result
must be expected unless the proportionate base acreage figures dif-
fer very considerably from the given acreage figures.

It is obvious that there can only be one reversal from which ful-
filment of the base reversal test may be expected; this is the third
reversal. The other two reversals refer to comparisons which are
different from the comparison made in the original index. The prod-
uct of the original index and the first reversal will indeed exceed
unity. However, there is no reason to look suspiciously at arith-
metic index numbers, as if they were higher than they ought to be.
The alleged "type" bias of the arithmetic mean may be explained
as the legitimate result of different comparisons expressed by the
original index and its usual reversal. The product of the original
index and the second reversal may be less than unity, equal unity,
or exceed it. Unless it equals unity, the original and reversed in-
dices express different comparisons.

2. *The Meaning of the Harmonic Mean*

Since it has been shown that the arithmetic index may be written
as an aggregative which meets the base reversal test, a reevaluation

of the harmonic mean is necessary. An analysis of the alleged down-
ward type bias of the harmonic mean is analogous to the analysis
of the upward bias of the arithmetic mean. The harmonic index
may be designated as such or as an aggregative:

$$\frac{\sum a_1}{\sum \left(\frac{y_0}{y_1} \cdot a_1 \right)} = \frac{\sum \left(\frac{y_0 a_1}{y_0} \right)}{\sum \left(\frac{y_0 a_1}{y_1} \right)} \tag{2}$$

If this index is reversed according to the first method, the reciprocal
of the arithmetic index (1c) is obtained. The product of the har-
monic index and this reversal must necessarily be less than unity
for the same reason for which the product of the arithmetic index
and its corresponding reversal exceeds unity. The product of the
harmonic index and its second reversal may be less than, equal to, or
exceed unity. The third reversal is the reciprocal of the harmonic
formula (2); where that is used, the base reversal test is met.

The product $y_0 a_1$ in the aggregative form of the harmonic index
consists of base yield and given acreage. An index number calcu-
lated from this formula is the quotient of the acreage required to
raise the production $y_0 a_1$ of each crop with base yields and of the
acreage required to raise the same production composite with given
yields. This production composite, i.e. the object of the comparison
between given and base yields, should be held constant for the
binary comparison between given farm and base and also for the
application of the base reversal test. However, if it is kept constant
for all farms in a series, no larger production is received from higher
yields. The advantage is of an indirect nature; high yields reduce
the acreage necessary to raise the constant production composite.
The assumption of a constant production composite for all farms
in a series is in conflict with the concept of varying yields the meas-
urement of which is the very purpose of a crop yield index number.
Besides, a given zero yield would render the value of the denomina-
tor of the index infinite. These are specific arguments against for-
mula (2), but no general arguments against the harmonic mean.
Formula (4) which will be introduced below may be conceived of
as a harmonic mean which is acceptable.

The essential consideration is to decide whether or not the ratio
which an index number constitutes is meaningful and serves the de-

sired purpose regardless of whether such a ratio of aggregatives
may also be conceived of as an arithmetic or harmonic mean.

3. *The Concept of the Geometric Mean*

A common approach to the geometric mean has been to regard
it as a happy compromise between the opposite, alleged biases of
arithmetic and harmonic means. Since it has been shown that the
magnitude of arithmetic and harmonic indices depends on the
object (the production composite) with regard to which the yields
are compared, a reexamination of the geometric mean is desirable.
The geometric mean expresses the average *rate* of change. The
acreage weighted geometric index may be designated as

$$\sqrt[\sum a_1]{\prod\left(\frac{y_1}{y_0}\right)^{a_1}} \text{ or logarithm of index} = \frac{\sum\left(\log\frac{y_1}{y_0}\right)a_1}{\sum a_1} \qquad (3)$$

Using the same numerical illustration as above an index of 87 is ob-
tained as geometric mean of the two yield relatives 150 and 50.
This index would indicate that the given farm has obtained lower
yields than the base. Actually, however, the same production com-
posite of 1.5 tons of soybean hay and of .5 ton of timothy can be
raised on 2 acres of the given farm as well as on 2 acres of the base,
as has been shown. The point becomes even clearer, if yield rela-
tives of 200 and 50 are to be averaged. The geometric mean of
100 states that these yields average equal to base yields, whereas the
arithmetic mean of 125 states that the base would require 25 per-
cent more land than the given farm to raise the production com-
posite under consideration. The arithmetic mean of 125 answers the
question that has been asked. Whenever a crop yield index number
is supposed to express a comparison of acreages necessary to produce
a certain production composite with different yields, an aggregative
which is equal to a weighted arithmetic mean should be used. The
geometric mean does not express the kind of a comparison which is
desired for a crop yield index number in connection with its com-
mon uses. For example, for measuring the effect of crop yields on
earnings, a decrease from 40 to 20 will not reduce earnings by as
much as an increase from 40 to 80 will increase them. With the
geometric mean these two differences are considered to offset each
other. Furthermore, the geometric mean fails to meet the tests of
determinateness and of association. The former demands that an

index number must not become zero or infinite, if one single ob-
servation is zero. The association test requires that the same crop
yield index number must be obtained whether the calculation be
based on the average yield of the entire acreage of a crop or on the
yields of each individual field. In the former case the production
from all fields in the same crop is added before the computation
of the index proper is begun. In the latter case the yield data from
each field are directly used for the computation of the index. Where
a geometric mean is used, two different results are obtained in these
two cases.

4. *The Double Weighted Index Number*

There is general agreement on the superiority of an acreage
weighted crop yield index number over a simple index. An acreage
weighted index takes into consideration that the importance of a
crop depends on the acreage on which it is grown; but it does not
recognize the differences in the importance of various crops due to
their different values per acre (i.e. price×yield). An index that re-
ceives an additional second weight such as value per acre is, for
all purposes for which crop yield indices have been used in the past,
a more refined measure than a single weighted index. If the symbol
p is introduced for price, the double weighted formula may be
written:

$$\frac{\sum \left(\frac{y_1}{y_0} \cdot y_0 p a_1\right)}{\sum y_0 p a_1} = \frac{\sum y_1 p a_1}{\sum y_0 p a_1} = \frac{\sum y_1 p a_1}{\sum \left(\frac{y_0}{y_1} \cdot y_1 p a_1\right)} \qquad (4)$$

The first expression is an arithmetic mean weighted by the value
of the hypothetical production obtained from base yields and given
acreages; the second expression is an aggregative; the third ex-
pression is a harmonic mean weighted by the value of the given
production. The three expressions have the same value. Working
presented the first two expressions weighted by standard or base
acreage (a_0) and also the aggregative weighted by given acreage
(a_1) as indicated above. The question of given vs. base acreage
weights will be taken up later.

The double weighted formula has been subjected to the criticism
that the use of a second weight results in an index that is no longer
a measure of yield differences alone; such a double weighted index

has been said to measure crop selection at the same time. This would be undesirable, since measures of yield and selection should be kept separate. However, if weights are used in computing the average of any set of data, it is not the weights that are being measured. A simple average is not affected by the number of items from which it is computed. Similarly, the single (acreage) weighted index is not influenced by the acreage of a farm. The reason for this is that weights are not only factors with which the data are multiplied but the sum of the weights is also a divisor. The numerator of an index number formula is certainly influenced by the acreage of a farm, but this influence is eliminated as soon as the numerator is divided by the denominator. What influence remains after this division, is brought about by the *proportionate* acreage of each constituent crop. Similarly, where the index is weighted by both acreage and value per acre, a high value per acre does not increase the magnitude of the index; neither does a low value per acre decrease the magnitude of the index. All depends on the magnitude of the relative yields. A high relative yield in a high value crop increases the index more than the same relative yield in a low value crop. This does not prevent a farm from having a high yield index and a poor crop selection at the same time.

Where no second weights are used, the tacit assumption is made that equal relative yields of, say, corn and timothy hay are of equal importance, where actually the yield of corn should in most cases receive more weight. The fact that by the introduction of the second weight yields are expressed in value units is irrelevant. Instead of value per acre several alternative second weights may be used. Total digestible nutrients per acre make an excellent second weight for feed crops, but they don't do justice to human food and industrial crops. In some states, productive man work units per acre are used as a second weight. This is a measure of input the use of which is based on the assumption that the more labor is spent on a crop the more important it is. This assumption may often be correct. Under Minnesota conditions, alfalfa must be considered more important and silage corn less important than the labor requirement of these crops would indicate. Another second weight is the relative net value of each crop. The Division of Agricultural Economics of the University of Minnesota expresses the relative net income from a crop by using a scale of four magnitudes. Each crop

is valued at 100, 50, 25, or 0. An arithmetic average of the relative net value figures of all crops weighted by the acreage of each crop constitutes the crop selection index. Neither this index nor the single (acreage) weighted crop yield index accounts for the greater importance of the yields of high value crops.

There are two objections to the use of relative net values. The first is that they may not be accurate for a certain farm and in a certain year. Average values for all farms rather than an individual set of relative net values for each farm are desired for the sake of comparability. Average values for a number of years are taken as a matter of simplicity so that the scale need not be changed every year. The objection to average values for all farms and for several years also applies to the use of these relative net values for the index of crop selection. However, it seems as if their usefulness outweighs this one limitation.

The other objection is that the relative net value scale is based on average yields. To obtain yields say 120 percent of the average may cost relatively more for one crop than for another so that the relations of the net income received from different crops are different at various yield levels. This objection is so serious that one may well decide to disregard the cost factor in the weighting of yield indices by using gross value rather than net value weights. Gross value per acre may be expressed in absolute terms as suggested in formula (4) or in relative terms. Rounded relative values lend themselves more easily to calculations than absolute figures. Where net value per acre is used as a second weight, the assumption is made that costs change strictly in proportion with yields. Where gross value per acre is used as a second weight, costs remain simply unconsidered. If costs are considered more or less constant regardless of the magnitude of the yield, gross value per acre is the superior second weight.

All second weights mentioned may be expressed algebraically and result in formulae similar to those presented for the gross value weighted index. Labor requirement per acre and relative net value per acre must be divided by average yield for the designation of the indices as aggregatives.

The gross value weighted index or a modification of it has its definite place in connection with acreage and production indices. An index of crop production compares a given composite produc-

tion with base composite production. The given and base production of each crop is weighted by the same price. The formula for this index is

$$\frac{\sum y_1 a_1 p}{\sum y_0 a_0 p}$$

This index may be split into yield and acreage indices in two ways:

$$\frac{\sum y_1 a_1 p}{\sum y_0 a_0 p} = \frac{\sum y_1 a_1 p}{\sum y_0 a_1 p} \cdot \frac{\sum y_0 a_1 p}{\sum y_0 a_0 p}$$

$$\text{or} \quad = \frac{\sum y_1 a_0 p}{\sum y_0 a_0 p} \cdot \frac{\sum y_1 a_1 p}{\sum y_1 a_0 p}$$

production index = yield index $\times$ acreage index

The two yield index formulae may be regarded as limits for the possible value of the yield index. A geometric cross of these two extremes results in a formula analogous to Fisher's ideal that fulfills the factor reversal test. The factor reversal test demands that the yield index must equal the quotient of production and acreage indices. The two yield indices given above meet this test also, but only if a given acreage weighted yield index is paired with a base yield weighted acreage index or vice versa. Where geometric crosses are used, both yield and acreage indices have been weighted by given and by base magnitudes. Working was the first to suggest such a yield index formula.

5. *Given Acreage* (a_1) *vs. Base Acreage* (a_0) *as Weight*

If all yield index numbers in a series are weighted by base acreages, farms with identical yields have the same index regardless of differences in acreage. However, where given acreages are used as weights the index becomes larger for a farm on which more land is planted to crops with high yield relatives and smaller for a farm on which more land is planted to crops with low yield relatives, even if the yield relatives remain the same. Therefore, the base acreage weighted index may be regarded as a pure measure of yield, while the given acreage weighted index measures both, yield and yield adaptation. Since there is no other measure for yield adaptation, a given acreage weighted index is superior to a base acreage weighted index for use as a management factor. If one wishes to obtain a measurement of yield adaptation alone, he must take the difference between given and base acreage weighted yield

indices. Where given acreage weights are used for the yield index, a change in acreage will affect both, the crop yield index and the crop selection index described in section 4. However, there is no correlation between the effects of changes in acreage on these two indexes: a larger acreage planted to a low net value crop with a high relative yield will depress the selection index but increase the yield index; a larger acreage in a high net value, high yielding crop will increase both indexes. If one of the two indices is increased the other one may increase or decrease.

Where double weights are used, the same analysis applies. The second weight effects only a refinement of the adaptation aspect. An increase in the acreage of a low-value, high-yielding crop will increase the crop yield index less than a similar increase in the acreage of a high-value, high-yielding crop.

It should be noticed that the crossing of given and base acreage weighted formulae discussed in the preceding section makes little sense in connection with the present analysis regarding yield and yield adaptation. It cannot be recommended to measure pure yield plus the halved effect of yield adaptation. Therefore, the cross formula is no general purpose crop yield index formula. It has its place only in connection with acreage and production indices on account of its fulfillment of the factor reversal test.

6. *The Test of the Average*

Where base yields are averages of given yields in a series, the arithmetic mean of all index numbers weighted by their denominators[5] must equal 100 percent. This test may be called the test of the average. It may also be stated as follows: the sum of the numerators of the indices must equal the sum of the denominators.[5] In the calculation of yield indices the yield of each crop may be expressed as a relative of the average yield of this crop on all farms. Thus, average yields of all crops are made equal to 100. The average of these average yields is, of course, also 100. This result has been obtained by averaging the yield relatives of each crop on all farms first and by averaging these averages of the yield relatives for all crops afterward. In the calculation of a crop yield index number the yield relatives of all crops on each farm are averaged. If these averages (or crop yield indices) are averaged, the result must again equal

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[5] The numerators and denominators referred to are the dividends and divisors of which the index numbers are quotients.

100, since it has been obtained from the same data as in the first case.[6] The failure of a series to meet this test would result in a serious inconsistency; the magnitude for the grand average of all yield observations in a study would differ depending on whether it had been computed from the average yields of all crops or from the average yields of all farms. Where base acreages are used as weights, a crop is thought to have been grown on the same acreage on all farms. Therefore, all yield observations for that crop are equally important and the average or base yield (y_0) should be a simple arithmetic mean yield. Where given acreages are used as weights, the importance of each yield observation varies according to its acreage. In this case, the average or base yield (y_0) should be the arithmetic mean yield weighted by given acreages, i.e. the quotient of total production and total acreage of a crop.

It has often been observed that a simple arithmetic mean of a series of crop yield indices exceeds 100. This is due to the fact that large farms frequently have lower yields than small farms. If the test of the average is met, the weighted arithmetic mean of the indices will be 100. In a simple mean the large farms with their low yields have been weighted too lightly and the small farms with their high yields too heavily; subsequently, the mean tends to exceed 100.

Whenever the simple arithmetic mean of a series of indices exceeds or falls below 100, some workers "correct" the series by dividing each figure by the mean so that the mean of the "corrected" series becomes 100. Where the test of the average is met, such a "correction" is entirely unnecessary. Where the test of the average is not met, because simple average yields have been used with given acreage weights, no such "correction" method can really

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[6] The following example serves to illustrate this requirement. No weights are used for the sake of simplicity.

Farm	Yield relative			Index
	Corn	Oats	Alfalfa	
A	85	90	120	$98\frac{1}{3}$
B	105	115	90	$103\frac{1}{3}$
C	110	95	90	$98\frac{1}{3}$
Average	100	100	100	100

With formula (1) each index must be weighted by the given acreage of each farm (i.e. by its denominator Σa_1) so that the grand average will be 100.

correct for the incorrect indices obtained. The magnitude of the indices that fail to meet the test deviates considerably from the magnitude of the truly correct indices.[7]

7. *The Limited Comparability of Crop Yield Index Numbers*

When crop yield index numbers are ranked or used for a correlation study, the tacit assumption is made that they are comparable among themselves. An index of 120, for instance, is thought to be 150 percent of an index of 80. This assumption rests on shaky ground for two reasons. First, in a diversified type-of-farming region no two farms are likely to grow exactly the same crops. A crop yield index that was based only on the crops that are common to all farms would not be representative for any given farm. When the binary comparison between the yield of all crops on a given farm and the base yield of these same crops is made, the base consists of different elements in each comparison. Second, the production composite which is the object of the binary comparison differs not only in kind but also in quantity for each binary comparison, where given acreage weights are used. With a single weighted index the production composite varies even with base acreage weights, since it is made up of the product of *given* yield and base acreage of all crops and given yield varies. Disregarding this variability of the object of the comparison it may be stated that a farm with an index of 120 has 150 percent the yields of a second farm with an index of 80 with respect to the base production composite. But the magnitude of the yield index with respect to the production composite of either of the two farms remains unknown. The comparison of the two yield indices is only an indirect one, with regard to the base. If the use of yield indices for correlations has shown good results in the past, this is due to the fact that most farms that are included in a correlation series raise the same crops on a large part of their acreage and the proportion which each crop occupies of the total acreage is also somewhat similar from farm to farm. But whenever one ranks crop yield indices or uses them for a correlation, he should have a clear understanding that he no longer stands on safe ground.

[7] For the 20 farms of the Winona County (Minn.) Detailed Farm Accounting Route, 1940, the mean difference between a properly computed index number series and one for which simple average yields have been used with given acreage weights is 4.15. The difference in magnitude of the indices ranges from 9.9 to zero.

Conclusions

(1) Whenever the base reversal test is applied, one must ascertain that both original and reversed indices express the magnitude of the average yield with regard to the same production composite. (2) Where crop yield indices are put to one of their common uses, a geometric formula does not express the comparison sought. (3) Crop yield index numbers should be double weighted by acreage and by a second weight, such as relative net value per acre or, preferably, by gross value per acre. For use in connection with acreage and production indices a geometric mean of given and base acreage weighted formulae is advantageous. The second weight does not result in combined measurement of yield and selection; it rather results in a refinement of the index by averaging the individual yield data according to their importance. (4) A base acreage weighted yield index may be regarded as a pure measure of yield. A given acreage weighted index measures yield and yield adaptation at the same time. This latter index is superior for use as a management factor. (5) Where base yields are the averages of all given yields for all crops, the test of the average should be met. The sum of all numerators of the indices in a series must equal the sum of all denominators. No "correction" should be made by which the simple arithmetic mean of the series is made equal to 100. (6) If a series of crop yield index numbers is ranked or used for a correlation, one should be conscious of employing a somewhat questionable technique.

THE EFFICIENCY OF FEEDING LIVESTOCK

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THE significance to the economics of production of the patterns in which the productive elements are combined has long been recognized. This phenomenon, and its corollary, the varying returns to any single element, have been treated either as studies of individual operations or as hypothetical schedules for an entire industry set up for classroom illustration.[1]

This paper represents an attempt to derive comprehensive ratios between the elements of production for a selected industry, the livestock industry. It therefore is associated with the second of the two customary methodologies. But it extends beyond the hypothetical level of exposition, for factual data are utilized.

One approach to the subject would be to assemble and summate all available experimental data on feeding livestock. More recently there have been studies of a somewhat different type, the most publicized of which is one relating to dairying conducted jointly by the Bureaus of Agricultural Economics and Dairy Industry.[2] In this study observations of the relationship of feed input to milk production at varying intensities of feeding were made at 10 State Experiment Stations on cows maintained under carefully regulated experimental conditions. The control of the intensity of feeding is the unique and most important feature of the study. The results provide the most useful data for a given class of livestock that are available.

Experimental data on returns from varying intensities of feeding are not available for all classes of livestock. Furthermore, the problem in a consideration of the entire livestock industry involves more than aggregate input-output ratios at selected levels of intensity. It involves also the particular levels of intensity that are observed for each year, and in addition, the price and other factors that determine the level of intensity, and that therefore are regarded as basic in governing the scale of livestock production. A

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[1] Cf. John D. Black, Production Economics. F. M. Taylor, Principles of Economics. George M. Peterson, Diminishing Returns and the Planned Economy (with bibliography, p. 244).

[2] Reported in a preliminary form as Farm Management Report No. 5, Determining Input-Output Relationships in Milk Production, Einar Jensen, Bur. Agr. Econ. Mimeographed, and in U. S. Dept. Agr. Tech. Bul. 815, Input-Output Relationships in Milk Production, Einar Jensen and others, May, 1942.

complete study of relationships between the elements of production in the industry would seem to be a worthwhile approach.

Two statistical series that have been made available recently by the Bureau of Agricultural Economics are of value for such an entire industry analysis. The first series provides estimates of average consumption of feed grains by each class of livestock during the period 1928–32.[3] When related to the total production from each class of livestock, these data permit factors to be calculated establishing average feed requirements per unit of livestock production. The second series is an estimate of the disposition of the supply of each of six feed grains into their various uses, including feed for livestock.[4] The analyses in this paper are based largely on data from these two sources.

The attempt here is not to determine the particular practices adopted by individual hog feeders or dairy cattle producers or other livestock farmers under specified conditions of feed supply and price, but rather to determine the sum of the complex of individual adjustments as it appears on a national basis. For this reason the subject is called "efficiency of feeding" in preference to the more specific terminology used in technical discussions of production economics. The term itself is considered to be the ratio of livestock production in the United States to the quantity of feed grains that disappears annually into consumption by livestock, expressed with 100 percent as a normal.

The discussion in this paper is composed of two major parts, the first relating the comparisons between the two basic series of livestock production and feed grains fed, indicating the variations from year to year in the ratio of efficiency of feeding; and the second examining the observations in relation to the theory of diminishing returns, that theory being used as a logical framework, a sort of screen on which to project the analysis.

General Trends

A common and natural notion is that livestock producers are more efficient in the use of feed than they were 30 years ago. Usually submitted as supporting evidence are the important achievements during the last several decades in the science and techniques

[3] By R. D. Jennings, Bureau of Agricultural Economics, Unpublished.
[4] By Malcolm Clough, Bureau of Agricultural Economics and the author. Also unpublished.

of livestock feeding: education on the value of balanced rations; emphasis on sanitation heralded at first by the McLean County system for hogs; advances in livestock equipment and machinery, outstanding among which is poultry raising equipment, which was at the wire coop stage in 1915; and other improvements that are well known.

A measure of efficiency of feeding cannot be considered, however, to be a direct measure of effectiveness of either mechanization or the efforts in agricultural education. A large body of farmers as yet untouched by so-called modern methods, or in an economic position that prevents adoption of them, forms a large inert element in national total figures. Further, it seems likely that new techniques are more responsible for making possible a greater commercialization of agriculture than for changing normal production ratios.

Certain statistical evidence may be introduced to show that productiveness has increased. The acreage of cropland in the United States devoted to feed grains and hay is no larger now than it was in 1910. Yet the index number (with 1910—14 as 100) of livestock slaughter was 116 in 1936 and 119 in 1939; and that of dairy and poultry production was 145 in 1936 and 155 in 1939.[5] But these figures have not been adjusted for changes in crop yields, in utilization of feeds, or in horse and mule numbers, corrections that are necessary for the comparisons to be valid.

A more accurate analysis shows that any marked trend in efficiency of feeding is extremely difficult to prove. Indeed, any secular trend at all is hard to find. The data for these observations have already been referred to and are given in Table I and graphed in Figure 1. The volume of production of livestock products is measured by weights that are the average feed grain consumption per unit of each class of production, computed for the years 1928 to 1932 and considered to be normal.[6] The total figures

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[5] Frederick Strauss, and L. H. Bean. Gross Farm Income and Indices of Farm Production and Prices in the United States, 1869–1937. U.S.D.A. Technical Bulletin No. 703, pp. 132 and 135.

[6] The weights or factors are as follows: horses and mules on farms, 1970 pounds per head (Jan. 1) per year; hogs, 456 pounds per cwt. of pork (live wt.) produced; cattle, 128 pounds per cwt. of beef and veal produced; sheep 72 pounds per cwt. of sheep and lambs produced; dairy cows, 21 pounds per cwt. of milk produced; chickens, 423 pounds per cwt. produced; and eggs, 46 pounds per 100 eggs produced. All production figures are for the calendar year succeeding the crop year, since there is a lag between crop supply and livestock production. The slow responsiveness of production to changes in feed supply is especially pronounced in the case of chickens and milk cows, for body weight is a reserve causing inertia or stability.
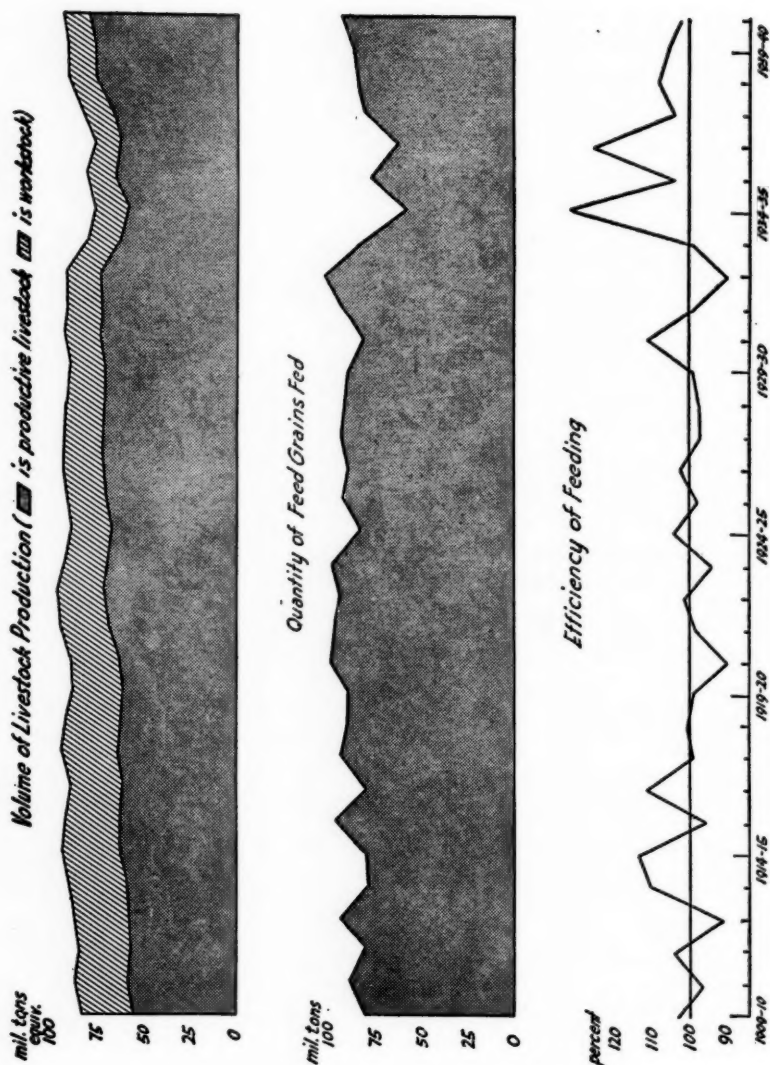
Fig. 1. VOLUME OF LIVESTOCK PRODUCTION, QUANTITY OF FEED GRAINS TO LIVESTOCK, AND RATIO OF EFFICIENCY OF FEEDING, 1909—10 TO 1940—41.

TABLE I. THE ESTIMATED VOLUME OF LIVESTOCK PRODUCTION AS MEASURED BY NOR-
MAL FEED REQUIREMENTS, THE DISAPPEARANCE OF FEED GRAINS INTO
CONSUMPTION BY LIVESTOCK, AND THE RATIO OF EFFICIENCY OF
FEEDING, ANNUALLY FROM 1909–10 TO 1940–41

Year	Volume of livestock production as measured by normal requirements for feed grains	Disappearance of feed grains as feed[1]	Ratio of efficiency of feeding
	Thous. Tons Equiv.	*Thous. Tons*	*Percent*
1909–10	82,605	80,071	103.2
1910–11	85,203	89,365	95.3
1911–12	84,011	80,580	104.3
1912–13	85,706	94,076	91.1
1913–14	87,793	79,361	110.6
1914–15	91,778	80,194	114.4
1915–16	91,154	95,348	95.6
1916–17	89,482	79,986	112.0
1917–18	92,398	93,131	99.2
1918–19	90,455	90,176	100.3
1919–20	87,458	89,803	97.4
1920–21	89,084	99,296	89.7
1921–22	95,152	96,724	98.4
1922–23	96,664	94,978	101.8
1923–24	92,266	98,357	93.8
1924–25	88,626	84,593	104.8
1925–26	90,447	92,699	97.6
1926–27	93,336	91,313	102.2
1927–28	92,304	95,002	97.2
1928–29	91,063	93,420	97.5
1929–30	90,112	90,583	99.5
1930–31	92,326	82,992	111.2
1931–32	91,318	92,901	98.3
1932–33	92,197	102,647	89.8
1933–34	80,741	81,662	98.9
1934–35	75,483	57,147	132.1
1935–36	81,696	78,725	103.8
1936–37	80,232	63,564	126.2
1937–38	83,938	80,575	104.2
1938–39	91,345	84,574	108.0
1939–40	91,458	86,614	105.6
1940–41	94,760	92,909	102.0

[1] Includes corn, oats, barley, grain sorghums, wheat, and rye fed.

thus actually are an index of total normal feed requirements, but
represent by their inherent nature an index of physical volume of
livestock production. They are expressed as tons equivalent. The
quantity of grains fed is determined by the disposition of corn, oats,

barley, rye, and grain sorghums into feed for livestock, plus estimates of the quantity of wheat fed.

The volume of total livestock production in recent years has been at about the same level as it was in 1910 to 1914. The index (million tons equivalent) for 1936–37 to 1940–41 averages 88.3; for 1909–10 to 1913–14 it was 85.6. The cause for the stability has been the fact that the decline in workstock, as measured by feed requirements, has been almost exactly equivalent to the increase in milk, egg, and meat production.

The quantities of grains fed also have been without great trend, any tendency toward trend having been interrupted by the droughts after 1933. It should be mentioned that feeds fed are not directly related to feed production, either in individual years or as a long time trend, because of changes in stocks held at the beginning and end of each crop year and of variations in non-feed uses.

Therefore, it may be concluded that the volume of livestock production (including workstock of course) and the disappearance of feed grains as feed, have not changed materially during the last 30 years. The fluctuations that have occurred have been those of individual years, not those of secular trend.

The fluctuations observed from year to year are much sharper for feed disappearance than for livestock production. For this reason the ratio between the two series, the "efficiency of feeding," also fluctuates from year to year. The variations in efficiency of feeding have extended from 89.7 percent of "normal" in 1920–21 to 132.1 percent in 1934–35. The year to year changes in the ratio of feeding efficiency are in sharp contrast to their secular stability.

There is an admitted margin of error in such yearly calculations. Not only does a lack of precision in defining the exact 12 month period for the yearly data enter in, but also there may be emergency use in many years of reserves of feeds other than grains. In addition, it is possible that production of meat, milk, and eggs is maintained in short-feed years at the cost of a loss of body weight by the breeding stock.

If the yearly variations in the ratio of efficiency of feeding were of purely accidental origin, they would disappear when converted to two or three-year moving averages, which greatly reduce the potential errors. In Figure 2 the variations as two-year averages are shown still to be considerable: numerically they vary from 94 to 118 percent. And as three-year averages the ratios have been

as much as 5 percent below normal and 21 percent above normal.
Figure 2 also is indicative regarding secular trends, for moving
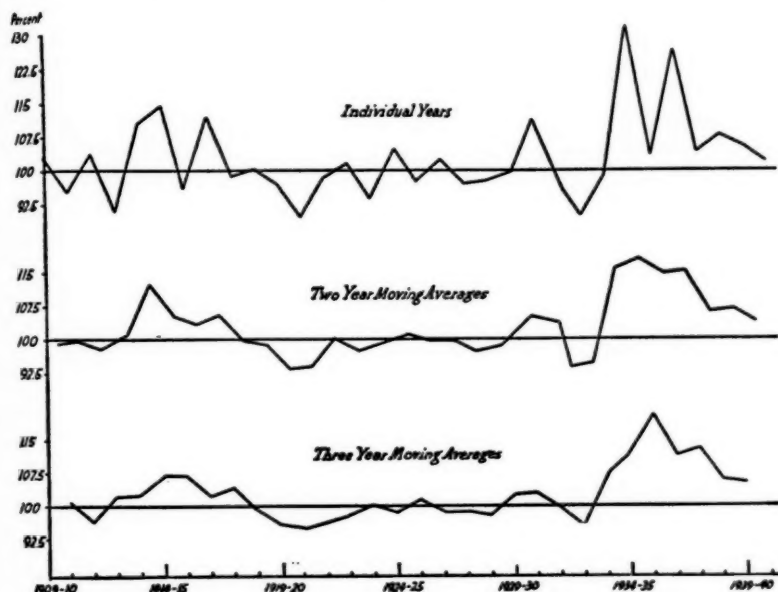
FIG. 2. COMPARISON OF RATIOS OF EFFICIENCY OF FEEDING FOR INDIVIDUAL YEARS
WITH TWO YEAR AND THREE YEAR MOVING AVERAGES, 1909–10 TO 1940–41.

averages are more closely related to secular forces than are data
for individual years.

One point should be made here, that the existence or non-exist-
ence of a secular improvement in the efficiency of obtaining live-
stock production from feed grains depends on the interpretations
given to the ratios for 1934–5 and 1936–7. The ratios for those
two years are extremely high, and are to be ascribed to the droughts
of those seasons. The fact that a high efficiency of feeding was ob-
tained under the conditions of those years is very significant to
this study, but to establish a trend line solely from drought-year
ratios is hardly a valid procedure. Even if support were to be given
to an idea that the efficiency of feeding livestock has risen in recent
years, the major, the important, conclusion from the data in Table
I and Figures 1 and 2 is that yearly variations are shown to be so
pronounced. An analysis of the nature of the yearly variations and
of the factors that govern both the intensity of feeding and the

ratio of efficiency obtained in each year, as deduced in line with the theory of diminishing returns, is undertaken in the subsequent section of the paper.

Efficiency of Feeding and Diminishing Returns

There is a reason, a decidedly valid one, for yearly variations in intensity and efficiency of feeding. It is not just a case of farmers using efficient management when their crops are short and being wasteful when they are under less pressure. Rather, the case is explained by the economic and physical forces that make profitable stingy feeding in some years and liberal feeding in others.

The theory of diminishing returns that may be considered in relation to this situation is that the last pound of feed fed to a cow or a hog produces a smaller quantity of milk or pork than does the preceding pound. The production of milk or pork from the successive pounds of feed, therefore, expressed as a rule, is said to decline. Similarly, the *average* production of milk or pork per pound of feed declines as more feed is fed. The total production increases at a decreasing rate. Although the total production is largest when the greatest possible quantity of feed is fed,[7] the average production per pound of feed is largest when less feed is fed, and the added production per successive pound of feed also is largest at relatively low feeding levels.

The diminishing returns from feeding thus accepted as applying on individual farms also hold true as an aggregate for the industry. The larger average production of milk or pork per unit of feed at low feeding levels becomes, for the industry, a high rate of efficiency of feeding when feed supplies are short. In the same way, the smaller average yield of livestock products under heavy feeding is parallel with a relatively low efficiency of feeding when feed supplies are abundant.

According to these circumstances we would expect that the position of the total livestock industry with respect to diminishing returns could be established by a comparison of livestock production with feed grains fed in years of high and low feed supply. The comparison is made possible by the fact that the series in Table I on the normal-feed-requirements equivalent of livestock production affords a good index of the volume of livestock production, and is

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[7] Presumably a point of maximum total returns could be reached, but it is beyond practical consideration.

aided by the method of calculation that sets the average return per
ton of feed as approximately 1.00. The comparison is set forth in
Figure 3, by means of a direct cross-plotting of the two major
series in Table I.

At approximately a level of 90 million tons of feed grains fed a
unitary return is obtained: 90 million tons equivalent of livestock
and livestock products. But the unitary relationship does not hold
true throughout. The line of regression does not have a 100 percent
slope. Feeding 100 million tons of feed grains appears to elicit a
response of only 94 million tons equivalent of livestock production,
but 80 million tons of grains result in nearly 86 million tons
equivalent production. The line of regression is relatively flat, and
although, at the mean, one ton of feed grains gives an average re-
turn of one ton of livestock production, a ton of *additional* feed
grains fed gives an additional return of only 0.41 ton of livestock
production. A 10 percent change in feeding thus results in only a
4.1 percent change in livestock production.

The levels of intensity of feeding usually followed appear, there-
fore, to be rather far advanced. They extend to the more advanced
stages of diminishing returns. The expansion in livestock produc-
tion that can be obtained by increased feeding is only moderate in
scale.[8] And the reduction in livestock production accompanying
small crops also is small. This situation is disconcerting when in-
creased livestock production is desired, but is reassuring when low
crop yields are in prospect and a small feed supply has to be
reckoned with.

These results are very similar to those Jensen found for dairy
production. He noted that near the feeding standard level the
average return is approximately 2.2 pounds of 4 percent milk per
pound of feed, but that the additional return for an additional
pound of feed is only one-half as much.[9]

Even though livestock production is relatively stable, there is
good reason for livestock feeders to be responsive to changes in the
level of feed grain supply. When their operations are scaled so far
into diminishing returns that they obtain only four-tenths as much
production from the last pound of feed as from the average pound,
they can not afford to maintain full production when unfavorable

[8] All observations are in line with the size of the crop and livestock plant as it has
generally prevailed. It might be possible to expand uniformly over a period of years
to an entirely new, larger plant, with present feeding ratios maintained.

[9] Op. cit., footnote 2.

conditions beset them, nor can they profitably expand production except under the most favorable circumstances.

The regression in Figure 3 indicates quite accurately the stage of diminishing returns under which the livestock industry operates. But it does not indicate the cause for the volume of livestock production that is obtained in each year. To suggest that the level of feed supply is the single basic factor associated with livestock production is grossly to minimize the price and the economic factors that are very important, and also to infer that haphazard accidental factors are not frequently important.
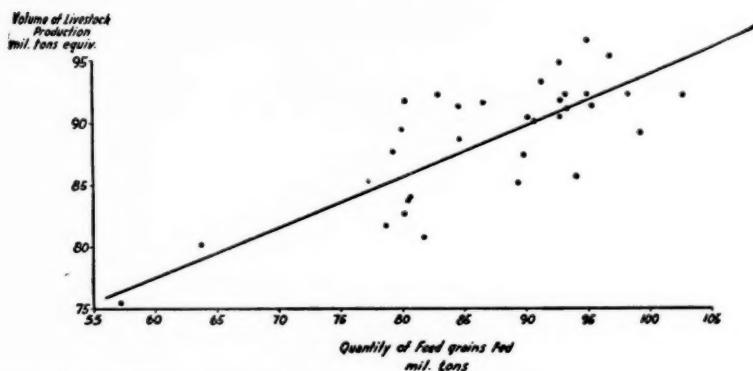
FIG. 3. REGRESSION OF THE ANNUAL VOLUME OF LIVESTOCK PRODUCTION UPON THE QUANTITY OF FEED GRAINS FED.

The attempt here is not to construct a multiple-correlation analysis to account for 80 or 90 percent of the variations in livestock production, but instead to show the basic, the fundamental, factors that operate to determine the volume of livestock production and the efficiency of feeding in any year. These factors may be established from a more introspective interpretation of the theory of diminishing returns, and may be evaluated according to basic data already available.

Adjustments in feeding methods and levels of intensity are made on individual farms, and are caused not by adherence of feeders to a pedogogical schedule of diminishing returns but rather by responses made by them to stimuli expressed in the form of prices. The relationship between feed supply and livestock production is expressed through the price and market mechanism, and the prices of both feed and livestock products have to be included in a com-

prehensive study. But it is above all the fact that an entire-industry approach is used here that makes a consideration of prices essential, for although a single farmer can start with a fixed price and assume, correctly, that his production has no effect on that price, in the whole industry the inter-relations of production and price are very significant.

According to economic theory the price relationships in line with diminishing returns are established through rather complicated equilibrium adjustments. When the feed supply is smaller than normal for the livestock on farms in the United States, there is a demand for feed at the prevailing price that is greater in physical quantity than the supply. Consequently, the price of feed rises. As it does so, the intensity of feeding declines, and the demand for feed contracts. An equilibrium point is reached when the price rises to the level at which the input of feed to livestock equates with the supply available. At that point the value of the meat, milk, or eggs produced by the last unit of feed fed is equal to the price of that unit of feed.

Feed grains have a unique position in that they are subject to very little competitive demand. For the staple grains, corn, oats, barley, and grain sorghums, the demand in the market other than for feed is relatively small, and for theoretical treatment may be neglected. Under these circumstances, and according to the theory of equilibrium adjustments just mentioned, the price of feed grains may be considered to be that price which is equivalent to the value of the livestock products obtained from the last unit of feed input fed at a level of intensity at which the total units of feed required are the same as the number available.

This brief statement of the nature of equilibrium adjustments serves, if nothing more, to show their complexity. The curve of diminishing returns from feeding livestock is based on a balancing of values for feed grain consumption, feed grain prices, livestock production, and livestock product prices.

The relationships between feed grain prices and consumption and livestock prices and production can be expressed with any factor regarded as causal. In actuality, however, the time element imposes a limit on some of the values, for the consumption of feed by livestock can be no greater during a given year than the total quantity available (it can be less, though, and has been in some recent years), and there is a virtual practical limit to the increase in livestock pro-

duction that is possible within a short time. With these reservations, there are no bounds to the values that may be assigned to the various factors. The burden of this analysis is chiefly to indicate the

TABLE II. INDEXES OF PRICES RECEIVED BY FARMERS FOR ALL FEED GRAINS
AND FOR ALL LIVESTOCK PRODUCTS
1909–10 to 1939–40

Year	Price received for feed grains, crop year	Price received for livestock products calendar year
	1910–14 = 100	1910–14 = 100
1909–10	103.1	103.0
1910–11	87.1	87.9
1911–12	107.9	97.3
1912–13	90.3	104.8
1913–14	111.6	106.4
1914–15	115.1	101.3
1915–16	112.8	115.2
1916–17	175.7	160.9
1917–18	226.6	192.1
1918–19	228.7	205.4
1919–20	238.0	194.5
1920–21	114.0	128.6
1921–22	85.2	126.5
1922–23	117.2	129.4
1923–24	129.3	129.9
1924–25	160.1	152.1
1925–26	112.7	156.7
1926–27	117.5	149.0
1927–28	135.9	155.8
1928–29	128.8	160.4
1929–30	124.9	134.6
1930–31	93.3	97.9
1931–32	53.5	70.8
1932–33	53.6	68.2
1933–34	86.2	78.8
1934–35	132.9	112.6
1935–36	96.4	116.2
1936–37	158.4	124.2
1937–38	86.9	108.9
1938–39	75.6	101.4
1939–40	90.0	103.3

Feed grains included are corn, oats, barley, and grain sorghums. Livestock products are milk, eggs, chickens, hogs, beef cattle, sheep and lambs, and veal calves. Weights used are production of crops and of milk, chickens, and eggs, and slaughter of meat animals. The calendar year for livestock products prices is that of the second in the stub heading.

ratios that prevail between the factors, and then briefly to point out the normal responses that may be expected when certain of the factors change in value.

Comprehensive average prices for feed grains and for livestock products are necessary for these operations. Computed with quantity of production as weights according to the "Ideal" formula used by Strauss and Bean[10] they are listed for the years since 1909–10 in Table II.

Let us assume first a starting point, which may be a mean point, at which to illustrate the relationship between prices and feeding levels. If we take 90.00 million tons of feed grains as a base, at which livestock production also is 90.00 million tons equivalent; a return from the last unit of feed of 0.41 unit, which may be converted to a return from 5.0 tons of feed of 2.05 tons equivalent of livestock production; and an index of prices of livestock products of 122;[11] we can calculate the value of the last unit, or 5 tons as taken here, of feed fed. For, according to the theory of the equilibrium adjustments in livestock feeding, the value of the added quantity of production from the added quantity of feed fed is equal to the value of that feed. The value of 2.05 tons of livestock production is an index of 2.05 times 122, or 250.1, in index form. The index of feed grain prices per ton is 250.1 divided by 5.0, or 50.0. Actually, this index has to be adjusted to 123, the index of feed grain prices separately determined for these conditions.[12]

The data can be set up as follows:

Total quantities production		Increment of production		Index of livestock product prices	Value of increment of livestock production (adjusted)	Actual index of feed prices
Feed fed	Livestock products	Feed fed	Livestock products			
Mil. Tons	Mil. Tons Equiv.	Mil. Tons	Mil. Tons Equiv.			
85.00 90.00	90.00	5.00	2.05	122	123	123

If we assume the "increments" of feed fed and of livestock production to remain unchanged and move up to the next step, we calculate that 95.00 million tons of feed grains will yield 92.05 million

[10] Op. cit.

[11] Mean price, 1910–14–100, when the Bureau of Labor Statistics wholesale price level is assumed to be 90. (1926–100), and livestock production is 90.0 cwt. tons equivalent.

[12] Mean price, 1910–14–100, when the Bureau of Labor Statistics wholesale price level is assumed to be 90 (1926–100), and feed grain supply is 90.0 million tons.

tons equivalent of livestock production, and the remaining results
will be as shown below:

Total quantities production		Increment of production		Index of livestock product prices[13]	Value of increment of livestock production (adjusted)	Actual index of feed prices[14]
Feed fed	Livestock products	Feed fed	Livestock products			
Mil. Tons	*Mil. Tons Equiv.*	*Mil. Tons*	*Mil. Tons Equiv.*			
85.00	87.95					
90.00	90.00	5.00	2.05	122.0	123.0	123.0
95.00	92.05	5.00	2.05	117.8	118.9	115.0

At uniform increments the quantities of feed grains fed and of
livestock production are as shown above, and the price indexes, at
the elasticities of demand indicated, are calculated to be 117.8 for
livestock products and 115.0 for feed grains. But the value of the
last increment of livestock production should also be 115.0, in-
stead of 118.9, according to the theory of equilibrium adjustments
by which the value of the last unit of livestock production should
be equal to the value of the feed fed. In the discrepancy between the
indexes of 118.9 and 115.0 above the basic error in a uniform incre-
ment of livestock production is illustrated.

The nature of this discrepancy has an additional significance from
the standpoint of theory. When a constant figure is used for the
change in livestock production per unit of change in feed supply,
and it is as low as almost a 1:2 ratio, there is set forth thereby a
tendency for feed grain prices to fall twice as fast as livestock prod-
uct prices. Some of the difference is taken up by the higher elas-
ticity of demand for livestock products, but a complete balancing
requires a falling rate of return from ("efficiency of") feeding. It is
on a falling ratio of efficiency of feeding that the entire livestock-
feed grain complex is based.

By a series of calculations the original table can be brought into
balance. The results are as follows:

[13] Calculated by applying an elasticity of demand of 1.40, which has been gen-
erally found in published analyses and in the author's studies. It is related here to a
10 percent deviation from the mean, describing a straight line regression.

[14] Calculated by applying an elasticity of demand of 1.10, which was determined
in analyses of disappearance of total feed grains as feed in relation to prices, made by
the author.

Total quantities of production		Increment of production		Index of livestock product prices	Value of increment of livestock production (adjusted)	Actual index of feed prices
Feed fed	Livestock products	Feed fed	Livestock products			
Mil. Tons	Mil. Tons Equiv.	Mil. Tons	Mil. Tons Equiv.			
85.00	87.95					
90.00	90.00	5.00	2.05	122.0	123.0	123.0
95.00	91.98	5.00	1.98	118.0	114.9	115.0

The procedure of calculation may be extended to formulate an entire schedule of feed consumption, livestock production, and feed and livestock product prices, constructed according to theoretical principles but derived from actual observations. Such a schedule is presented as Table III, with the ratios graphed in Figure 4.

Table III contains a complete set of equilibrium adjustments to changes in the quantity of feed grains fed to livestock. The increment of livestock production is seen to become smaller and smaller at the more intensive feeding levels. But at all levels the increment in livestock production is smaller than that in feed grains fed. The livestock industry is characterized by operations at diminishing

TABLE III. SCHEDULE OF NORMAL EQUILIBRIUM RESPONSES OF LIVESTOCK PRODUC-
TION, PRICES OF LIVESTOCK PRODUCTS, AND PRICES OF FEED GRAINS, TO
VARYING AGGREGATE QUANTITIES OF FEED GRAINS FED TO
LIVESTOCK IN THE UNITED STATES

Quantity of feed grain fed	Quantity of livestock production	Increment of livestock production from last five units of feed	Index of prices of livestock products[1]	Index of prices of feed grains[2]	Efficiency of feeding
Mil. Tons	Mil. Ton Equiv.	Mil. Ton Equiv.			
70	81.45	2.27	139.4	155.0	116.4
75	83.67	2.22	134.7	147.0	111.6
80	85.84	2.17	130.4	139.0	107.3
85	87.95	2.11	126.2	131.0	103.5
90	90.00	2.05	122.0	123.0	100.0
95	91.98	1.98	118.0	115.0	96.8
100	93.89	1.91	114.1	107.0	93.9
105	95.72	1.83	110.4	99.0	91.2

[1] Elasticity of demand of 1.40, with Bureau of Labor Statistics wholesale Price Index at 90.00.
[2] Elasticity of demand of 1.10, with Bureau of Labor Statistics Wholesale Price Index at 90.00.

returns at all parts of the Table, although the degree is less advanced at low than at high feeding levels. The ratio of efficiency of feeding varies from 116 to 91 percent within the limits of the Table.

Prices of feed grains fluctuate much more rapidly than do prices of livestock products. Yet, because of the shifts in the relationship of feed grains fed to livestock production, such marked changes in feed prices cannot be said to have serious effect on livestock producers. At no point in the Table can producers be regarded as losing money, although the base on which they can make a profit is smaller when feed supplies are small.

At all points in the Table the basic theory holds: that the value of the livestock production from added units of feed is exactly equal to the price of those units of feed. All data in the Table are in correspondence with this principle.

The data in Table III nevertheless may be subject to checking and adjusting as more complete basic observations and more accurate appraisals of elasticities of demand are ascertained. The elasticities used are 1.40 for livestock products and 1.10 for feed grains.[15] The data of the Table also are subject to caution in their use at the high and low values. The general proposition that statistical analyses are most reliable near the mean or center of the array of basic data holds true here.

Illustrative Observations

The data in Table III, also displayed in Figure 4, show the normal responses by process of equilibrium adjustments that are to be expected from given quantities of feed grain consumption. When the quantity of feed grains to be fed to livestock is known, the normal production of livestock products, and the prices of livestock products and of feed grains, can be determined. But all generalizations as to equilibrium adjustments can be held to be true only when extraneous factors are made normal or ineffective. Equilibrium processes require a freely competitive market, and when

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[15] The factors used may be regarded as too high for livestock products and too low for feed grains. But the elasticity of demand for all livestock products taken together is higher than an average of factors for individual products. The factor of 1.40 may even be too low. With regard to feed grains, the difference between all grains and individual grains applies, but of more importance is the distinction between demand when livestock production is considered not to change (a short-time function) and that when the normal response of livestock production to a change in feed supply is allowed for.

they are applied to the livestock industry they depend on the general organization of the industry remaining virtually unchanged. No rapid change in productiveness of cows or hogs; no new truly "miracle" feed preparation; no epidemic of livestock disease; no marked shortage or superabundance of hay or kinds of feed other
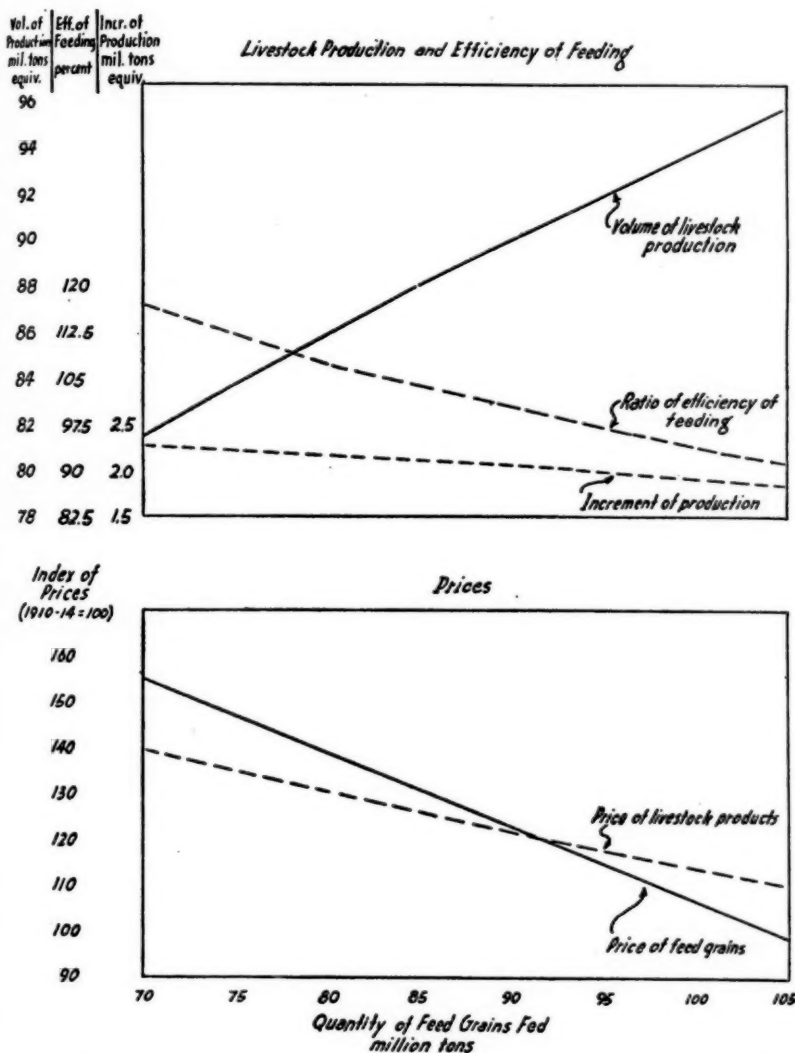
FIG. 4. NORMAL RESPONSES TO THE QUANTITY OF FEED GRAINS FED TO LIVESTOCK.

than grains, are to be assumed. In all analyses it is difficult to name all the factors to be included in a broad *ceteris paribus*.

Most particularly, the data in Table III are based on feed grains supply remaining the causative factor. When a certain level of feed grain consumption is selected, and the various responses calculated from it, the assumption is made that the interplay of forces takes place in a freely competitive market. On no other assumption can the data in Table III be held valid. This fact does not prevent, however, describing inverse relationships, as are shown below. The normal response to a changed level of feed grain prices can be determined, but in this case all the other factors have to be regarded as free, unrestricted, and unlimited. Another point is that the price series are set up in relation to a Bureau of Labor Statistics wholesale price index of 90 on a 1926 base.

One further qualification is necessary. All the phenomena are of short-time nature. Livestock production is that of the calendar year, lagging only a few months from the crop year. The response of livestock production to feed supply thus involves no great change in numbers of breeding stock. "Production," incidentally, is used in the technical sense adopted by livestock statisticians, referring, in the case of meat animals, not to slaughter but to actual gain of live animals on farms, and is unaffected by high slaughter figures caused by distress liquidations of herds or flocks. It is likely that livestock production is a great deal more responsive to a changed level of feed supply or to changed livestock or feed prices (see p. 615) over a period of several years than it is during a shorter period.

From another point of view, the data of Table III are a rationalization, a quantitative measurement and a balancing of forces and adjustments that are very familiar to all analysts. When feed is plentiful its price falls, more is fed, more livestock products are produced, and the price of livestock products falls. Just one factor is added in the analysis here: that in addition to the other responses, under those conditions the efficiency of feeding declines.

The following series of observations serves two purposes. It illustrates the responses to given situations as expressed in the familiar percentage form. It shows, for example, what happens, in percent changes, when feed grains fed are increased 10 percent. But it also illustrates other interpretations that are possible from Table III, showing what happens when other factors are changed.

The effects of a change in prices for livestock products, for example, are also of significance on many occasions and may be set forth as equilibrium adjustments determined from Table III.

Changes in Feed Grain Supply. The values may be read directly from Table III, with only a few interpolations to put them in percentage form. As an example:

Basic change	Response	
Feed grain consumption increased 10%	Livestock production increased	3.9%
	Prices of livestock products fall	5.8%
	Prices of feed grains fall	11.4%
	The ratio of efficiency of feeding falls	5.5%

Changes in Feed Grain Prices. Under present conditions of established, maintained, supported, or otherwise influenced prices for feed grains, the normal equilibrium effects of changes in feed grain prices are of decidedly practical significance. The normal response from a 10 percent increase in prices, when all other factors are assumed to be subject only to purely competitive forces, may be calculated from Table III to be the following:

Basic change	Response	
Increase in feed grain prices by 10%	Feed grain consumption reduced	8.5%
	Livestock production reduced	3.5%
	Prices of livestock products rise	5.3%
	The ratio of efficiency of feeding rises	5.5%

An approximately inverse response may be expected from a 10 percent decrease in feed grain prices, unless there are not enough feed grains available for consumption to increase a full 8.5 percent.

Changes in Prices for Livestock Products. Definite policies regarding support of prices for various livestock products have been adopted recently by the Department of Agriculture. The degree of responsiveness that is normal from an increase of 10 percent in prices can be calculated approximately from Table III, and is as indicated below:

Basic change	Response	
Increase in prices of livestock products of 10%	Feed grain consumption increased	5.6%
	Livestock production increased	2.0%
	Prices of feed grains rise	7.0%
	The ratio of efficiency of feeding falls	3.2%

A rise in livestock production of only 2 percent from an increase of 10 percent in prices seems discouragingly small. Also, it seems strange that support to livestock prices should have a much greater effect, in percent change, in raising feed prices than in stimulating livestock production. But these responses are calculated from a uniform, over-all increase in prices for livestock products, in which case no single product is allowed to compete with any other. Actually most price support programs are centered on selected products, thereby improving their competitive position and gaining a response much greater than the comprehensive figure as shown above. One additional fact, however, should be mentioned and emphasized, that as the production of one selected product is encouraged by means of a supported price, all other livestock products are subjected to a sharper competition and thus discriminated against.

These observations are merely examples of the conclusions that can be reached from the relationships established in Table III. The process of equilibrium adjustment in line with the theory of diminishing returns has manifold implications. A few of the major ones, with illustrative interpretations, have been set forth here.

Significance of Supply of Other Kinds of Feed

Only standard feed grains have been considered in this paper. Certain other feeds are very similar and are generally substitutive for feed grains. Chief in importance are the mill feeds. Data on the disappearance of all mill feeds can be obtained only for recent years, their inclusion in a long-time study thus being prevented. All by-product feeds taken together comprise a tonnage about 10 percent as large as feed grains. Except for a gradual increase in protein concentrates since 1930, the disappearance of by-product feeds has been fairly constant from year to year. It has the effect of a stabilizer of feed supplies, but is not an actual reserve or substitute for years of low feed grain production.

The largest complementary source of feed is hay and other forage. In rations for feeding livestock, hay and grain cannot be considered directly substitutive, one for the other; yet a number of feeding trials have shown that pronounced realignment of rations can be made, if done properly, without seriously affecting the level of production. The importance of hay and forage disappearance with regard to livestock production can be considered a subject for a separate study rather than a factor in feed grain relationships. So

far as the volume of hay fed in individual years is to be analyzed, it also appears not to offset or counterbalance grain supplies but rather to be correlated directly with them. The same climatic factors that raise or lower grain production in an individual year tend to have a parallel effect on hays. If in the years ahead, however, large reserve supplies of some or all feed crops are built up, the relation of hay to feed grain consumption may quite possibly be changed.

The really important point in considering sources of feed supply other than grains is that the secondary sources make possible the gain in feeding efficiency in years of short feed grain crops. The apparent ease with which the production of meat, milk, and eggs was maintained during the drought years may be ascribed in part to the working of the principle of diminishing returns; but it also may be ascribed in part to the effectiveness with which farmers make use of feeds that previously were wasted or used carelessly. Corn fodder and stover, low-grade hays and sorghums, and even pasture lands normally unused may be a partial cause for an efficiency of feeding ratio as high as 132 percent in 1934–35. The exact division between causes for variations in ratios of efficiency of feeding may be a moot issue; but, so long as agriculture is organized with methods of production virtually as they are now, the issue is not significant for any practical purpose. The aggregate effect from the various causes may be regarded to be approximately the ratios calculated in this paper.

The position of supplementary feeds does not change the basic conclusion that may be reached from this study: that there is a definite, definable relationship or ratio between the total quantity of feed grains consumed by livestock and the aggregate quantity of meat, milk, and eggs produced; that this relationship fluctuates from year to year but only about an average or norm which has not changed materially since 1910; and that the yearly fluctuations are in the nature of responses to supply and price factors, particularly to the tonnage of feed grain supply. Further, the fluctuations in the feeding ratio are caused primarily by variations in the quantity of feeds fed, for the production of livestock products varies much less by comparison. A last conclusion therefore is that a reduction in feed supplies in any one year or even over several years does not have calamitous consequences to the production of meat, milk, and eggs for consumption by the consuming population. Nor can a sup-

ply of feed grains that is unusually large be counted on to give proportionately large supplies of meat, milk, and eggs. A reduction in livestock production does not come unexpectedly or whimsically, but an increase in livestock production also is not quickly or easily obtained.[16]

Summary

Important achievements in the knowledge and techniques of livestock feeding have taken place during the last several decades. Whether or not these improvements have been so generally adopted as to bring about a change in the physical relationships and to increase the quantities of meat, milk, or eggs produced from a pound of grain has been a subject of wide interest.

The analysis in this paper makes use of average requirements for feed grains per 100 pounds of meat, milk, or eggs produced, determined for the period 1928–32 as a norm. Relating the annual production of livestock and livestock products to the annual disappearance of feed grains into feed for livestock shows that the production per pound of feed, or ratio of "efficiency of feeding" was as high as 130 percent of normal in the drought years 1934 and 1936 but as low as 90 percent of normal in two other years. Annual variations thus have been decidedly larger than any secular trend that can be shown.

The annual variations in the efficiency of feeding are not purely haphazard but may be explained in significant part by the level of feed grain supply and by other factors. The analysis of these variations is made possible by two characteristics of the situation:

Most of the feed grains produced go into consumption as feed; therefore, the average price of feed grains may be considered with very little error to be that accruing from the value of livestock products produced; and, the production of meats and other livestock products from feed grains follows the structure of a schedule of diminishing returns.

The price of a pound of feed grains thus can be computed to be the value of the livestock products obtained from the last increment of feed. The accuracy of such a computation can be checked by the known elasticities of the price of feed grains and of livestock prod-

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[16] Cf. Jensen, in his preliminary report, p. 11, " . . . there is a very considerable amount of physical elasticity in dairy feeding. With the same dairy herds it is possible to utilize larger than normal feed crops and this can be done with small loss in efficiency. This is especially true if the additional feed is in the form of grain. Similarly in a year of shortage it is possible to reduce the ration without as serious consequences to production as have so far been assumed."

ucts. It is, in the final consideration, the correspondence of the re-
sults of these two separate calculations that in large measure
verifies this analysis. In addition, as correspondence is established,
an entire schedule can be set up showing equilibrium adjustments
in livestock production and in prices for feed grains and for live-
stock products in response to changes in feed grains fed. This
schedule proves better than empirical observations the degree of
diminishing returns under which the livestock industry operates.

The relationship thus determined between the volume of live-
stock production and feed grain disappearance is a curve with a
convex curvature but a rather small slope, indicating that under
average conditions the response of the production of meat, milk,
and eggs to a change in feed grains fed is less than half as sharp as
the degree of change in the quantity of feed. More particularly,
an increase in feed grains fed of 10 percent from their mean results,
on the average, in an increase of 3.9 percent in the quantity of live-
stock production; a reduction of 5.5 percent in the ratio of effi-
ciency of feeding; a fall of 5.8 percent in prices of livestock products;
and a fall of 11.4 percent in prices of feed grains.

The rather low degree of responsiveness of livestock production
to feed grain supply can be reassuring to those whose concern is the
maintenance of an even supply of food for the Nation's population,
for hazards to crop production in any year are reduced in intensity
by half when their effect on livestock production is considered. But
the same responsiveness is a handicap when the goal is a larger
production of livestock products, and a great effort in expanding
feed consumption is necessary in order to obtain a sizable increase
in livestock production.

CHANGES IN THE AGRICULTURE OF SOUTH CENTRAL BRAZIL

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THE states of São Paulo and Minas Gerais in South Central Brazil produce agricultural products which are both competitive and complementary to North American agriculture. To the north of Minas Gerais agriculture is more wholly complementary, to the extent that there is any production at all, while to the south production is largely competitive with the United States. Developments in this transition region of complementary coffee and competitive cotton and beef are likely to go far in making Brazil, as a nation, closer or more distant in trade relations, especially since about 20 million people live in this area, nearly half of the population of Brazil and nearly a sixth of that of Latin America. Changes in Southern Brazil should provide some keys to the type of forces that are in operation in agriculture, which may complicate or facilitate solution of problems of inter-American relationships.

There have been several dramatic changes in Brazilian agriculture since 1930, most prominent of which are the decline of coffee and the expansion of cotton. Table 1 compares production in 1939 and 1934 with a base period approximating 1930. There have been increases in the production of nearly all products except coffee, although in a few cases the expansion in production has not kept pace with the increase in population. (The latter increased between 15 and 20 percent from 1930 to 1940.) Part of the increase has gone to increased exportations while part is represented by increases in domestic consumption. The effect has been to decrease the emphasis on coffee and increase the diversity of the products exported.

This paper will discuss the reasons for these changes in three states of Brazil, namely Minas Gerais, Rio de Janeiro and São Paulo. It seems to an observer that these changes in land use patterns have arisen from two primary factors, namely: (1) Changes in technology in agriculture, including soil depletion and increased insect and disease problems; and (2) Changes in price relationships derived from domestic inflation and from shifts in foreign supplies

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TABLE 1. CHANGES IN BRAZILIAN AGRICULTURAL PRODUCTION OVER A PERIOD APPROXIMATING 1930 TO 1934 AND 1939

Crop	Units	1930	1934	1939	Change from 1930 to 1939
Coffee trees[1]	Million trees	2,588	2,846	2,500	− 3.4
Coffee[2]	1,000 bags of 60 kilo	27,236	27,542	22,067	−19.0
Cotton fiber[2]	100 metric tons	955	2,846	4,285	349.7
Oranges[2]	1,000 cases	12,000	34,889	35,794	198.3
Cattle pop.[3]	1,000 head	34,271[7]	40,514[7]	41,883[7]	22.2
Hog pop.[3]	1,000 head	16,169[7]	23,183[7]	23,543[7]	45.6
Meat (all kinds)[4]	100 metric tons	7,574	10,758	11,179	47.6
Butter[3]	1,000 kilos	25,912[8]	28,892[12]	43,243	66.9
Cheese[3]	1,000 kilos	25,146[9]	39,189[12]	42,191	67.8
Milk, all uses[5]	Million kilos	2,099	not avail.	2,394[5]	14.1
Corn[2]	1,000 metric tons	5,027	5,292	5,405	7.5
Rice[2]	1,000 metric tons	913	1,214	1,457	59.6
Beans[2]	1,000 metric tons	695	827	786	13.1
Sugar cane[3]	1,000 metric tons	15,898[10]	18,496[13]	19,322	21.5
Manioc root[3]	1,000 metric tons	4,975[11]	4,947[13]	6,837	37.4
Timber[3,6]	1,000 metric tons	116	136	405	249.1
Cocoa[2]	1,000 metric tons	69	127	135	95.7
Carnauba wax[3]	Metric tons	7,940	8,059	11,476	44.5
Rubber[3]	Metric tons	17,137	12,104	19,366	13.0
Castor beans[3]	1,000 metric tons	90[11]	155[13]	120	33.3
Brazil nuts[3]	1,000 metric tons	33[9]	51[12]	34	3.0
Erva-mate[3]	1,000 metric tons	93[9]	84[12]	96	1.1

[1] Anuário Estatística do Café, 1939/40. Departamento Nacional do Café. Secção de Estatística. Rio de Janeiro, Brasil.

[2] Data for 1930 from Resumo Anual de Estatísticas Econômicas, 1932–1939. Serviço de Estatística Econômica e Financeira do Tesouro Nacional. Ministerio da Fazenda. Rio de Janeiro, Brasil. Data for 1934 and 1939 from references (3) below.

[3] Brazil, 1938; 1939–40; 1940/41. Instituto Brasileiro de Geografia e Estatística, and Ministry of Foreign Affairs. Rio de Janeiro, Brasil. In English.

[4] Tables furnished by the Serviço de Estatística da Produção, Ministerio da Agricultura, Rio de Janeiro. Data for 1930–34, 1935 and 1939. Includes only animals slaughtered in "matadouros municipais" and "frigorificos" which approximates the meats exported or consumed in urban markets.

[5] Data for 1930 from Boletim do Departamento Nacional do Comercio, Ministerio do Trabalho, Oct. 1, 1931, Rio de Janeiro. The other data are for 1938 from references (3) above. The data include only the production in Minas Gerais, São Paulo, Rio Grande do Sul, Rio de Janeiro and Santa Caterina.

[6] Includes exports only.

[7] Data for 1920, 1935 and 1938.

[8] Data for 1930–33.

[9] Data for 1930–34.

[10] Data for 1929–33.

[11] Data for 1931–35.

[12] Data for 1935.

[13] Data for 1936.

and demands so that the exchange rate of the milreis has declined considerably. Principal emphasis will be given to the nature of and reasons for the trends in technological conditions.[1]

RUBBER
General Geographical Area
Principal Producing Areas

SOUTH AMERICA

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A number of changes in technical conditions have been facilitated by the sharp depreciation of the milreis, since this provided a favorable economic situation for propagandizing for better production methods in a number of export crops, and forced the

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[1] The author regrets that it is not possible to give greater precision to the analysis than is done in this paper, and in some cases must ask for acceptance of statements without corroborating data. The reason is the sheer inadequacy of Brazilian data for any precise analysis, and the shortage of time and resources (including war induced transportation shortages) to supplement such Brazilian data as are available. Reference will be made from time to time to individual farms visited as examples of trends in operation and not as definitive proof of the fact of the trend. To a greater and more obvious extent than usual in economic analysis, acceptance or rejection will have to be based upon an appraisal of the analyst's capabilities as an observer.

broadening of the perspective of the average large farmer of Brazil. Contrariwise, the greater efficiency in Brazilian production resulting from technological changes has had its effect on the price of the milreis, but has been too weak when taken in conjunction with domestic inflation to counteract the changes in foreign demands and supplies. Again some of the changes in foreign supplies may be the result of changes abroad, which cannot be discussed here. Recognizing these interrelations, it is still possible to separate the domestic technological conditions from the outside influences; in fact, this must be done if any appraisal of Brazil's agricultural development and potentialities is to be made.

Changes in Technological Conditions

Technological changes in Brazil take a different pattern than recent changes in the United States. One large field of technical innovations is almost completely absent, although it is the one which people in the United States usually consider first. Agricultural machines are relatively unimportant in the agricultural field, especially the labor-saving type of machine. Prices of most agricultural machines are based on U. S. price plus transport plus tariff while agricultural wages of twenty to forty cents a day are a third or less of the relatively low wages of the southeastern United States. Consequently, the labor-machine ratios are such that only the most extreme of the labor-saving machinery are profitable and machines play an even smaller part in agricultural production. The important improvements in technology have been in varieties of crops and livestock produced, in organizing market standards and enforcing them, in developing efficient marketing organizations and in making a particular commodity an important part of the individual farm or national economy so that attention is directed toward making its production more efficient in many simple ways. That these may be as dramatic and far-reaching as the introduction of the tractor is demonstrated by the expansion of oranges and cotton and, over a longer period, of beef cattle in the pastures of Central Brazil, which will be detailed directly.

A second important difference in the pattern of technological change is the role of the fazendeiro or large farmer in usually adopting the practice earlier. New practices may be fairly widespread among the larger farmers before any appreciable number of small farmers are using the practice. The higher level of education

and the wider economic and social circles in which the owners of the large farms move gives them access to new developments more rapidly and makes possible the more rapid diffusion of the practical results of such techniques.[2] On the other hand, their relatively secure economic position leads many to ignore the gains made possible from changes which show only slight returns, so that spectacular results may be seen if only major technological changes are studied while very slow shifts will be noted if the minor changes are considered, especially if considerable modification of the traditional patterns are required. A case in point are the differences in technological change in cotton or oranges as compared with corn and hogs.

Coffee: Basic to an understanding of the nature of the shifts in the São Paulo-Minas Gerais region is the exploitative character of coffee production. During the past 100 years coffee has been moving westward into the "terra roxa" and near "terra roxa" soils of São Paulo and of northern Paraná and out of Espirito Santo, Rio de Janeiro and Minas Gerais. The extension of railroads and modern transportation has contributed materially to this movement, but more important is the belief (or fact) that coffee cannot be grown a second time on the same soil and be profitable. This results in the pattern that Preston James calls a hollow frontier,[3] that is, a less dense pattern of population behind the frontier than at the frontier itself. According to popular belief coffee trees must be planted on newly cleared virgin soil, and will grow and produce for 40, 60 or more years. Then the land must be abandoned and a new location started. Technicians at the Instituto Agronomico in Campinas insist that proper fertilization, selection of trees and other good production techniques will permit a profitable second

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[2] It should be unnecessary to remind the reader that the pattern of land ownership in most Latin American countries is made up of many very small farms interspersed among a few extremely large estates, and that the production and the political and economic power of the latter is usually dominant.

The differences in efficiencies between small farmers and large farmers appear to be much more favorable to the large farmer than in the United States, because advantages to the large farmer in reduced taxation, better marketing channels and in better technological orientation go far to offset the greater administrative costs on the large units. All of these can be partially related to the low level of education and agricultural knowledge resulting from 60 per cent or more illiteracy. For example, data on coffee yields in 1933–34 in São Paulo by size of farm show a more than 50 per cent higher yield per tree and per unit of land for the large farms compared to the small farms, and the quality of the coffee from the small farms is usually poorer. It is likely that part of this difference in yields is attributable to the poorer innate fertility often true of the soils farmed by the smaller operators.

[3] Preston E. James, Latin America, Lothrop Lee and Shepard Co. 1942.

planting of coffee on the same ground but farmers still claim that it is too expensive and does not pay. Be that as it may, very few farmers use land for coffee a second time and these few are not satisfied with the results. As a result coffee land is being gradually shifted in the older regions from coffee to pasture, cotton, corn, sugar cane, eucalyptus for firewood or other crops. Since coffee is very frequently planted on the tops and sides of the hills and provides much opportunity for erosion, the abandonment of coffee frequently leads to a sharp reduction in the intensity of operation.

The artificially high coffee prices during the late 'twenties kept many coffee trees in production beyond the time at which they would normally have been abandoned, resulting in a higher rate of abandonment with the 1930 tumble of coffee prices. Incomplete data suggest that abandonment was on a considerably larger scale in the older districts of São Paulo than in the newer areas, while the states of Espirito Santo and Minas Gerais suffered a considerably larger cut than the newer states of São Paulo and Paraná.

TABLE 2. NUMBER OF PRODUCING COFFEE TREES IN VARIOUS STATES OF BRAZIL

State	1930	1934	1939
Espirito Santo	265,932,000	236,854,000	153,617,000
Minas Gerais	650,962,000	718,200,000	553,573,000
Rio de Janeiro	210,505,000	278,979,000	244,958,000
São Paulo	1,188,058,000	1,384,519,000	1,280,734,000
Paraná	28,492,000	41,312,000	61,434,000
Rest of Brazil	243,896,000	186,447,000	206,144,000
All Brazil	2,587,845,000	2,846,311,000	2,500,460,000

Note: The increase in 1934 over 1930 is due to the coffee trees planted in 1925 to 1930 that came into production by 1934, five to seven years after planting. New planting of coffee trees was prohibited in São Paulo about 1930 and later for other states.

Source: Anuário Estatística do Café 1939–40. Departamento Nacional do Café, Secção de Estatística, Rio de Janeiro, Brazil.

In addition to the usual errors of enumeration in the censuses, the data are subject to bias since there is a law prohibiting the planting of new coffee trees but permitting the replacement of old trees. Since new planting is occurring anyway in the newer areas the data are likely to be too low in the new areas and too high in the older areas.

In one of the old *municipios* of Minas Gerais near Lavras, coffee production declined from 30,000 sacks (of 60 kilos) in 1937 to

4,000 sacks in 1942, while production of beans increased from self-sufficiency to an export product of about 40,000 sacks per year, while at the same time production of rice, milk, and beef increased.

This trend away from coffee means that both land and labor are released for other crops or for non-agricultural enterprises. Since pasture is an important use for abandoned coffee land and is much less intensive of labor, there is a net surplus of labor after the abandonment has taken place, which may be applied to bringing new land into cultivation, either pasture or forest, to new Brazilian industries or mining or the laborers may migrate to new frontiers in western São Paulo and Paraná or northeastern Minas Gerais.

Cotton: Much has already been written about recent technological changes in Brazilian cotton production.[4] In these, references are made to the extensive and well-done seed program carried on by the Instituto Agronomico in Campinas and now transferred to the extension service in São Paulo. This program succeeded in changing and improving the type of cotton grown on all farms, large and small, through control over the disposition of seeds at the local gins. In addition, efficient gins were built at many local points, and cotton was graded locally and in wholesale centers under a better system than had previously been operating. There has been a tendency to overplay the role of technology, and the development of new areas through clearing and to underemphasize the role played by prices. The ratios between coffee and cotton prices are certainly important and back of these ratios are the decline in the exchange rate and the special dispensations with which cotton was treated in the sale of foreign exchange. One other favorable technological consideration is the aging and abandonment of the coffee plantations, but it must be remembered that much of the coffee land is too steep, too erodible, or too rich for cotton, and that most of the cotton land has come from second grade virgin forests, pasture, and corn land. On the other hand, the movement of laborers from coffee to cotton is often as important as the shifts in land use.

A group of negative items which have unfolded in recent years need to be added to the picture presented by the above writers, which suggest that the costs of production of cotton in Brazil are slowly rising. The inevitable result of this under stable price rela-

[4] Omar Herrman, South Brazil, New Land of Cotton, Farm Credit Administration.

Paul Nyhus, Cotton Production in the State of São Paulo, Brazil. *Foreign Agriculture* Vol. 1, No. 1, January, 1937.

Sterling Evans, Brazil, The New Cotton Frontier, Pres. Houston Bank for Co-operatives, 1937.

tionship would be a lower level of production. In the western and northern part of the state of São Paulo, much cotton is being grown on land recently cleared of the forest with comparative freedom from pests and with negligible needs for fertilizer. The fertility of these soils is being depleted by a combination of continual cropping and sheet and gully erosion. After a year or two of cultivation the cotton leaf worm (coruquere) begins to take a toll and spraying is necessary.

With more time and in spite of control methods the pink boll worm (lagarta rosada) and cotton borer (broca da coleta) gradually build up in numbers and take an increasing toll. Incidentally the control for the cotton borer primarily takes the form of burning the plant residues and thus further reducing the organic matter content of the soil. The resultant lower yields from these factors increases the cost of production per unit of output of cotton and has resulted in substantial shifts from cotton to pasture in recent years in several areas of the state. An example may be cited from a large fazenda at Matão near Araraquara in northern São Paulo. One alqueire is about six acres.

Year	Cotton alqueires	Pasture alqueires	Corn alqueires
1935–36	2,466	Not available	157
1936–37	2,525	Not available	188
1937–38	2,429	4,840	327
1938–39	2,453	4,502	428
1939–40	2,326	5,085	346
1940–41	1,902	5,266	427
1941–42	1,600	6,400	448
Expected 1942–43	1,450–1,500	6,500	475

Actually these figures on cotton understate the extent of the shift on this fazenda since new land has been cleared for cotton to replace part of that lost to pasture. The fazenda is one of the few which is experimenting with terracing in the hopes of limiting erosion and making possible permanent cotton production with fertilization and greater managerial care than before. Another large farm, this one in Pompeia just east of the cotton center of Marilia in western São Paulo, has shifted completely out of cotton to pasture and corn and hogs, while many other neighboring farms are in process of liquidation. Both of these areas are in a fairly light soil zone where erosion and exhaustion of fertility goes on much more rapidly than in the older "terra roxa" soils.

An appraisal of the general situation may be obtained from the data of the Section of cotton seed distribution.[5] As each farmer buys

[5] Estatística da distribuição de sementes de algodão no ano agrícola de 1937/1938

cotton seed he reports on the area to be planted, tenure status, nationality, etc. A summary of the frequency table set up in terms of the number of sacks bought follows. Each sack of 60 kilos plants an

Sacks of seed purchased	Per Cent of total land in cotton		
	1937–38	1938–39	1939–40
1– 30	57.99	60.17	71.20
31–150	27.82	27.34	20.22
151 and up	14.19	12.49	8.58
	100.00	100.00	100.00
Total alqueires in cotton	475,566	445,739	621,382

average of six and a half acres of cotton. The table shows that the percentage of total land represented by the smaller plantings, less than thirty sacks, has increased considerably. Furthermore actual acreage planted by the larger purchasers decreased from 1938–39 to 1939–40 in spite of the increase in total cotton acreage, while that on small farms increased very considerably. This breakdown is not available for later years; nor are earlier data directly comparable although some suggestions are possible. This pattern, shown in Table 3, is approximately that in existence before the big cotton expansion began, and shows that the major portion of the cotton then was produced on the small farms. As the new techniques were introduced, expansion was greatest on the larger farms but in re-

TABLE 3. DISTRIBUTION OF COTTON ACREAGE BY SIZE OF FARM, AVERAGE NUMBER OF ALQUEIRES CULTIVATED AND IN COTTON, BY SIZE OF FARM—IN THE STATE OF SÃO PAULO, BRAZIL, 1933–34*

Area of farm in alqueires	Per cent of total cotton land	Average alqueires cultivated	Average alqueires in cotton
1–5	25	1.2	0.3
6–10	21	2.8	.6
11–25	16	4.7	.8
26–50	9	7.6	.7
51–200	13	17.1	2.2
201–500	8	46.0	3.7
501 and up	8	80.0	6.4
	100		
Total alqueires in cotton		121,843	

* Recenseamento Agricola-Zootechnico Realizado em 1934, Anno Agricola 1933–1934, Commissão Central do Recenseamento Demographico, Escolar e Industria e Commercio, Estado do São Paulo, Brasil.
An alqueire is about six acres.

(1938/1939 and 1939/1940), Serviço Cientifico do Algodão—Secção de Controle de Sementes, Instituto Agronomico do Estado de São Paulo, Brasil.

cent years the expansion has occurred on the small farms with decreases on some of the larger farms.

Total production figures have been relatively constant since 1939 and the data shown here suggest that the small farmers are continuing to expand production sufficient to offset decreases on the larger farms, partly through shifts from other crops and partly through clearing the forest lands and the bringing of it into production. Additional virgin forests farther west may be cleared, planted to cotton and the process of abandonment repeated but always at continually increasing transportation-costs and decreasing quantities of rainfall. Furthermore, considerable doubt has been expressed as to whether the scientific orientation of cotton seed production has been maintained at as high a level in recent years. There seems to be reason to believe that better seeds could be used and could be developed than are at present being used. The cotton enterprise of São Paulo gained in 1933–37 by giving the state a monopoly on cotton seed production but has been only holding its ground in recent years. Little further advances are being made. Obviously such judgments cannot be easily verified.

It is not possible to present further empirical evidence but it is the opinion of the writer that the serious erosion problem in many parts of the state, the loss of fertility through continual cropping, and the growing toll of insects will increase the cost of production and decrease the comparative advantage of cotton in São Paulo. Whether this results in reduced cotton acreage and production depends upon the future price relationships between cotton, beef through pasture and hogs through corn, and the extent to which more land is cleared in the more distant regions of São Paulo and Mato Grosso.[6]

HECTARES PLANTED IN COTTON IN MINAS GERAIS, BRAZIL, BY YEARS

Year	Hectares	Year	Hectares
1931	42,847	1936	112,900
1932	47,142	1937	144,920
1933	50,900	1938	94,293
1934	50,000	1939	62,755
1935	102,000	1940	55,492

Data taken from files and bulletins of the Departmento Estadual de Estatística Estado do Minas Gerais, Belo Horizonte, Minas Gerais, Brazil.

A hectare is a little less than two and a half acres.

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[6] The destruction of considerable quantities of coffee trees by frost during the winter of 1942 has probably resulted in some increases in cotton during this 1942–43 crop season and until the coffee trees are again producing. Furthermore the loan

In Minas Gerais the reduction of cotton production has been going on since 1937 in spite of a vigorous propaganda campaign, possibly because of the longer cropping history of much of the Minas farm land, the greater slopes and the increased damage from erosion. The production is now being centered into a few particularly favored areas with fairly level, fertile soils and with appropriate measures taken against the insects which would otherwise almost completely destroy the crop. These areas appear to be quite limited and show no disposition to expand under present beef-cotton price ratios; in fact, even these areas show a slight tendency to decrease production in favor of beef cattle.

Oranges: In most discussions of agricultural changes in Brazil, little attention has been paid to oranges.[7] In many ways the technological changes in oranges are similar to those of cotton, new varieties of the fruit being introduced, plus the development of improved marketing facilities, and a shift which gained in strength because of the increasing age of coffee trees in the region best suited to oranges. The original Washington Naval Orange came from Baiá in 1870, but Brazil did not become an important producer until improved varieties were reintroduced from the United States in the 'twenties. These new varieties provided oranges with a better flavor and sufficiently resistant to permit exportation to Europe. Actually the climate in most of Rio de Janeiro, Minas Gerais and São Paulo is extremely well suited to the cultivation of oranges. Serious frosts are practically non-existent, eliminating the need for fireboxes, rainfall is ample and most soils are adequate since the orange tree is probably less exigent than coffee and can be planted after coffee. Insects and diseases are not yet a very serious problem. The state of Rio de Janeiro is well suited for oranges since it is near an export port and is the center of production. Many areas in the interior are also exporting if near a railroad while in others production for the domestic market is increasing with salutary effects on the nutritional balance of the workers' diets. By virtue of the differences in seasons, competition with the northern hemisphere was somewhat reduced and the high quality Brazilian product was going to Europe in increasing quantity before the war.

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rate on Brazilian cotton has been increased several times so that present price ratios stimulate greater cotton production. This has happened in spite of sharp reductions in the export of cotton and the accumulation of stocks.

[7] An exception is Preston D. James in his book, Latin America, who mentions but does not evaluate its development. See also Fred A. Motz, The Fruit Industry of Brazil, Foreign Agr. Report No. 2, U. S. Dept. of Agr., Jan., 1942.

A number of cooperative packing sheds as well as independent companies have been set up easily since machinery requirements are low. Generally two grades are recognized, first and discards, the latter remaining for waste or farm consumption. The war transport problems and the refusal of Great Britain to grant import permits have practically halted the exportation of oranges but the trees remain, surrounded by thousands of rotting oranges. Numbers of bearing trees have steadily increased (recently because of the maturation of young trees) and stand ready to compete in the European (and perhaps Canadian and part of the United States) markets when transport is again available. The sale of orange oil to the United States plus increased domestic sales, both at much lower prices, has actually maintained many growers in a profitable position and suggests a very strong competitive position for this product.

Beef: Very little can be said about technological changes in beef production in Brazil without considerably more information than the writer has available. The most important development in the last fifty years has been the introduction and expansion of the Zebú cattle, originally from India, which are adapted to the extensive production of this region by virtue of their resistance to tropical diseases, ticks, and hoof and mouth disease. In India these cattle were sacred to the Indians and used only as draft animals but in Brazil they have become larger through selection or better feeding and the meat from them is exported in moderate quantities. Buyers say that the quality of the animals has increased noticeably during the last 15 years though empirical proof cannot be given. Research in mineral and other supplements is only partially developed and the problems of raising cattle under sub-tropical conditions are but little understood. The actual situation is such that many ranches will produce only 30 to 35 calves per year per 100 cows, the remainder of the cows will be sterile, not properly bred,[8] or will lose calves through abortion, disease or predatory animals. The losses can be reduced by fencing and using more labor to care for the animals, but the solution of many of the problems requires more knowledge of cattle diseases, breeding, and nutrition, under tropical conditions, than is at present available.

Beef production in Central Brazil was based almost wholly upon

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[8] If bulls are permitted to run haphazardly day and night, serving is much less effective than if the bulls are kept separate during the heat of the day. The latter requires more labor and fencing, especially on the enormous ranches of the interior.

pasture until three years ago. During the winter dry season (June–Sept.) most of the animals lose 15 to 25 pounds, regaining it with the green pastures of November and later. Since the outbreak of war and the loss of markets for proteins in the Low Countries the reduced price of cotton seed meal and the higher prices for beef have stimulated the use of cotton seed meal and a few other feeds as winter supplements on some farms to maintain weights. It is doubtful whether this technique will continue if old price ratios reassert themselves, especially in the regions distant from the cotton mills. On the other hand the experience gained with cotton seed meal is likely to stimulate experimentation with other supplements; in fact a few farmers are already using sugar cane instead of cotton seed meal. The result will be a slightly more intensive industry, with slightly better quality beef, with marketings occurring somewhat earlier and with an increase in the carrying capacity of the ranches.

A number of counteracting tendencies are operating in regard to carrying capacity. Several excellent grasses, such as Jaragua, *Hyparrhenia rufa,* and Coloneão, *Pennisepum purpureum,* are becoming more widely distributed, through natural and artificial distribution with substantial increases in the carrying capacity of the land. Furthermore there are increased amounts of pasture land coming from the abandonment of coffee and cotton fields, and in the interior from the burning of forests to provide greater opportunity for grass. Operating in the other direction, the regular burning of pastures, which is useful in the first years to clean up trees, stumps, and weeds, later reduces the amounts of available organic matter with deleterious effects. Moreover in some areas, particularly in Rio de Janeiro and southern Minas Gerais, the overgrazing with haphazard care has gone so far that worthless grasses, such as Sape, *Andropogon bicornis,* have appeared which considerably reduce the possible carrying capacity. The net result of these influences seems to be a gradual increase in the amount of pasture and a gradual deterioration of the older pastures.

Hogs and corn: Corn and hogs are a distinctly supplementary item on nearly all farms in this region, and possibly as a result, the changes, technical and otherwise have been very slight. The weights of market hogs are reported to have decreased slightly as a result of the expansion of cotton and the competition of the by-product, cotton seed oil. Several price ratios relating to hogs are reversed in Brazil as compared to the United States. Pork is more expensive

than beef, probably reflecting the cheap pasture land in the interior, while fat and lard are usually considerably more expensive than cotton seed oil. The result is that hogs come to market considerably older and fatter than do hogs in the United States. In recent years a few farmers have experimented with hogs as the principal or as one of the principal farm enterprises with rational and intelligent production techniques, such as balanced rations, sound breeding plans, and sanitation. However these farmers are and are likely to continue to be a small element in a generally fairly inefficiently operated hog production system.

Corn is likewise a stepchild of the coffee, cotton and beef enterprises. It is used as human food, as feed for hogs and beasts of burden but is not used to fatten beef cattle. Hard flint corn is preferred because of its insect resistance, but even so cannot be stored from season to season. A "hybrido," a cross between flint and dent varieties, is being grown in very small quantities in Minas Gerais and shows some promise, while new true hybrids are being developed by several experiment stations and are about ready for distribution. The author believes that the emphasis upon hybrids before high grade open pollinated varieties have been developed is poor judgement in terms of general usage. When hybrids become available it is probable that only the larger farmers are likely to understand the usefulness and limitations of hybrids, while the many small farmers will continue to use the traditional catch-as catch-can method of home selection. Since a large part of the corn land is steep, tractors, cultivators, and other modern equipment are not likely to reduce costs of production as in the United States Corn Belt; in fact, corn in Brazil is likely to be affected adversely by gains coming from the application of machine techniques in countries such as Argentina.[9]

Changes in Price Relationships

There have been a number of rather dramatic changes in price relationships between coffee and other Brazilian agricultural products, and to a lesser extent between export products and products for domestic consumption. Some of these changes are attributed directly to shifts in the foreign demand and supply situation, others, to this indirectly, through the fall in the exchange rate, while still

[9] Brazilian corn is tariff protected but has usually been exported in small quantities.

others have been affected by the inflation within Brazil. More recent changes stem directly from war needs and war induced transport shortages. Before illustrating and detailing these into their component parts, the price changes for a number of important products will be presented. As suggested previously some of these price changes are related to the previous section in that they may have concentrated more interest on technological improvements in a particular commodity because of the increased profit prospects.

TABLE 4. FARM PRICES OF COFFEE, COTTON, BEEF, RICE, CORN, BEANS, AND BUTTER
IN THE STATE OF SÃO PAULO, BRAZIL, 1929–1940
(Milreis per kilogram)

Year	Coffee[1]	Cotton[1,2]	Beef[3]	Rice[1]	Corn[1]	Beans[1]	Butter[4]
1929	2$670	3$520	19$000	0$470	0$270	0$700	6$000
1930	2$270	2$500	18$000	330	170	470	
1931	1$070	2$500	16$090	270	170	250	
1932	1$200	3$000	14$000	270	170	300	
1933	1$200	3$100	12$410	300	180	300	
1934	1$200	3$200	14$170	400	200	350	4$700
1935	1$500	3$900	14$580	300	170	330	4$100
1936	1$500	3$700	19$000	550	200	500	5$500
1937	1$500	3$700	22$700	570	230	500	6$500
1938	1$530	3$700	24$330	570	230	510	6$000
1939	1$550	3$700	24$750	550	210	520	6$200
1940	1$520*	3$500*	27$583*	550	220*	550*	6$500*

* Estimated.
[1] Estimate of price per kilo on farms in São Paulo, made by Serviço de Estatística da Produção—Ministerio da Agricultura, Rio de Janeiro, Brazil. Data are admittedly approximations but check moderately well with other fragmentary data available.
[2] Seed cotton (algadão em rama).
[3] Data furnished by Oscar da Silva Brito, Divisão da Industria Animal, São Paulo, Brazil. Price per arroba (15 kilograms) of beef dressed weight in the city. Cattle in Brazil are sold on the hoof but prices are quoted in terms of a fixed dressing percentage. Farm prices were not available so these prices are too high by the cost of transport.
[4] Actual price per kilo received by the agricultural school in Lavras, Minas Gerais. No state or federal reports on interior prices were available.
See Table 6 for the exchange rate of the milreis.

The most striking feature of recent price changes is the sharp drop in coffee prices, both absolute and relative to most other Brazilian products. Type 4 Santos coffee in New York was 21⅞ cents in 1929 and only 9 cents in 1933 while the price in Santos dropped from 32$333 (32 milreis 333 reis) in 1929 to 16$136 in 1931 and 13$250 in 1933. Since 1931 the farm price of coffee has been between 40 and 60 percent of its pre-depression level. There have been a number of additional barriers only partially reflected in the prices between coffee on the farm and coffee ready for export. In the early years a system of licenses slowed the movement of

TABLE 5. INDICES OF PRICE RATIOS BETWEEN COTTON, BEEF, RICE, CORN, BEANS AND
BUTTER WITH COFFEE IN STATE OF SÃO PAULO, BRAZIL, 1929–1940

Year	Cotton / Coffee	Beef / Coffee	Rice / Coffee	Corn / Coffee	Beans / Coffee	Butter / Coffee
1929	100	100	100	100	100	100
1930	84	118	83	74	79	
1931	177	211	143	157	89	
1932	190	164	128	140	95	
1933	196	145	142	149	95	
1934	202	166	189	165	111	173
1935	198	136	113	112	84	121
1936	187	178	208	132	127	164
1937	187	213	216	152	127	193
1938	183	224	212	149	127	175
1939	181	224	201	134	128	177
1940	175	255	206	143	138	189

Source: Taken from Table 4.

coffee to export markets while in recent years a sacrifice quota (one-third) must be delivered to the government for destruction before coffee can be deposited in Santos warehouses for export. These factors worsen the already unfavorable price relationships of coffee to other products. This crash of coffee prices was extremely serious for Brazilian exchange rates and foreign trade since 65 to 75 per cent of the foreign exchange had been purchased with coffee.

TABLE 6. VALUE OF BRAZILIAN MERCHANDISE IMPORTS AND EXPORTS, QUANTITY
AND VALUE OF BRAZILIAN COFFEE EXPORTS, PRICE AND PRICE INDICES OF
COFFEE IN NEW YORK AND SANTOS, EXCHANGE RATE OF MILREIS
FOR DOLLARS AND COST OF LIVING INDEX IN RIO DE
JANEIRO FROM 1928 TO 1941.

Years	Value of imports in Contos de reis[1]	Value of exports in Contos de reis[1]	Excess of exports over imports Contos de reis[1]	Exports of coffee No. of 60 kilo sacks	Exports of coffee Value in Contos de reis
1928	3,694,990	3,970,273	275,283	13,881,000	2,840,415
1928	3,694,990	3,970,273	275,283	13,881,000	2,840,415
1929	3,527,738	3,860,482	332,774	14,281,000	2,740,073
1930	2,343,705	2,907,354	563,649	15,288,000	1,827,577
1931	1,880,934	3,398,164	1,517,230	17,851,000	2,347,079
1932	1,518,694	2,536,765	1,018,071	11,935,000	1,823,948
1933	2,165,254	2,820,271	665,017	15,459,000	2,052,858
1934	2,502,785	3,459,006	956,221	14,147,000	2,114,512
1935	3,855,917	4,104,008	248,091	15,329,000	2,156,691
1936	4,268,667	4,895,435	626,768	14,186,000	2,231,472
1937	5,314,551	5,092,060	−222,492	12,123,000	2,159,431
1938	5,195,570	5,096,890	−98,680	17,113,000	2,296,110
1939	4,983,632	5,615,519	631,887	16,499,000	2,234,280
1940	4,964,149	4,960,538	−3,611	12,046,000	1,589,249
1941	5,514,417	6,729,401	1,214,984	11,052,000	2,017,116

TABLE 6 *(Continued)*

Years	Coffee in N. York		Coffee in Santos		Exchange rate of U. S. dollar[2]		Index of cost of living in Rio de Janeiro[2]
	Price per pound[2,3]	Index	Price per 10 kilos[2,3]	Index	Free mkt.	Official	
	cents		*milreis*				
1928	22¾	100	33$260	100	8$363	—	100
1929	21⅞	95	32$330	97	8$478	—	99
1930	12¾	56	21$010	63	9$238	—	90
1931	8⅝	37	16$140	48	13$665	16$029	86
1932	10⅜	46	15$220	45	—	14$144	87
1933	9	39	13$250	39	—	12$690	86
1934	11¼	48	17$050	51	14$843	11$831	93
1935	8⅞	38	16$330	49	17$365	11$796	98
1936	9¾	40	17$930	53	17$314	11$622	112
1937	10⅞	47	22$840	68	16$070	11$373	121
1938	7⅗	33	19$760	59	—	17$625	126
1939	7½	32	19$710	59	19$532	16$896	130
1940	7	30	18$750	56	19$797	16$896	135
1941	11⅕	48	33$220	99	19$726	16$593	150

[1] Comércio Exterior do Brasil, 1937–38, v. 1., and 1939–41. Serviço de Estatística Economica e Financeira do Tesouro Nacional, Ministerio da Fazenda, 1928–1932, 1932–1936, 1937–1938, and 1939–1941. Imprensa Nacional, Rio de Janeiro. A conto de reis is one thousand milreis and is worth (1943) slightly over fifty dollars.

[2] Relatorio de 1941, Banco do Brasil, S. A., Jornal do Commércio Rodrigues e Cia., Rio de Janeiro, 1942.

[3] Prices of Santos type 4 coffee in New York and Santos.

Coffee prices in 1930 held up better than other prices except beef, but in 1931 deteriorated sharply so that many other crops were better alternatives than in 1929, a situation which has persisted to the present. Since and as a result of the Inter-American Coffee Agreement, prices in Santos have climbed to about the pre-depression levels, and now are supported by American loans.

Cotton, rice, and beef prices have been high relative to coffee; in fact price ratios compared with coffee are or have been nearly twice as favorable as they were in 1929, chiefly due to the decline in coffee prices. At the time of the coffee crisis these products were minor export products of Brazil and a minor part of the world market and have benefited because of milreis depreciation combined with other favorable factors such as the AAA cotton control program. Beef prices are very favorable at present because of wartime employment and purchasing power in England, while cotton is being supported by Brazilian loans and coffee by American loans at ratios favorable to both beef and cotton. These products, particularly cotton, beef, and oranges, have been exported in greater quantities to supplement the decreased exportation of coffee (in value terms).

Corn, beans and butter are merely three examples of domestic products whose production has been maintained or expanded during the last ten years. As shown in Table 5, all are better alternatives to coffee than in 1929. (It should be remembered that the shift of agricultural workers from one crop to another is at least as important as the shift in land use.) Prices for these products have been good because of internal inflation and because the "Estado Novo" under Vargas has been able to maintain fairly full employment.

Now to return to a brief analysis of the reasons for these price changes. It is well-known that Brazil has a coffee-control program outdating the AAA and that her Central American and Colombian competitors have been expanding production as a result. The policies followed suggest the case of ologopoly with one dominant firm (Brazil) setting the price for the followers (Colombia, Costa Rica, et. al) but with several of these as fairly efficient producers who are expanding output.[10] This increased output coupled with world depression plus moderate expansion within Brazil under the artificial prices in the late 'twenties led to a Brazilian disaster in 1931 and 1932. Although 10 to 20 per cent more coffee was exported from Brazil in 1930 and 1931 it brought in a fourth to a third less foreign exchange. However the Brazilian government had few inhibitions about permitting the milreis to depreciate further (the milreis has had a general downward trend through most of its history) so that imports were cut even further, maintaining a strong favorable balance of trade until 1937, thanks to help from additional Brazilian tariffs and quotas. In consequence, cotton, beef, and rice, whose markets suffered no such cataclysmic decline as coffee, continued to be exported and at Brazilian prices two-thirds or three-fourths of their previous level while their prices gradually advanced as milreis depreciation continued.

Another factor of considerable importance in its effect on the exchange rate and upon the prices and markets for domestic products is the inflation within Brazil dating from 1931 or 1932. This policy derives in part from the emission of paper money while quelling the 1932 Revolution, the emission of money and credit as the

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[10] See Wm. H. Nicholls, Imperfect Competition within Agricultural Industries, Iowa State College Press, pp. 132–142.

Under the recent Inter-American coffee agreement, the analogy appears to have changed to an American dominant firm in reference to the rest of the world and a more complicated monopoly—monopsony or bilateral monopoly arrangement within the Americas although there is still too little time and too confused a pattern recently to permit of much generalization as to probable social effects of policy.

government took over the mortgage indebtedness of the coffee farmers as part of the post-revolution compromises to maintain the government and from the policy of financing public works by issuance of new money. As a result the currency deflation continued, even though new exports developed to supplement coffee. That the domestic inflation was considerable may be seen by the fact that the index of cost of living in Rio de Janeiro rose from a low of 86 in 1931 and 1933 to 130 in 1939 and 150 in 1941. Money in circulation approximately doubled from 1928 to 1941, while loans and discounts in banks have more than doubled.[11]

Table 5 shows the price ratios between coffee and six other agricultural products of the states of São Paulo and Minas Gerais. Most of these products were actually produced on a considerable part of the farms of the states, while the others, cotton and butter, were being produced in certain areas. Hence the shift in price ratios insured that substantial increases in these products were inevitable regardless of technological conditions. Actually, as has been shown above, the technical conditions stimulated a further and more rapid movement from coffee in the older producing areas to these other products. Acreages and number of laborers given over to coffee have decreased while those used for cotton, beef, and other products has increased.

A number of other products have been expanding in importance in this region, largely because of favorable price ratios. Foremost among these is sugar and its derivative alcohol. Early in the depression the government ordered that all gasoline should be mixed with alcohol (varying between 3 and 15%) so as to reduce imports of gasoline and to strengthen the market situation for the sugar producers. An Institute of Sugar and Alcohol was set up to control prices and output and has been so "successful" that sugar is now one of the most profitable crops in São Paulo and Rio de Janeiro. The recent gasoline crisis (June 1942 on) has increased sharply the need for alcohol as fuel and expansion of sugar-alcohol plants with guaranteed high prices is in process. Sugar remains a minor but expanding and profitable product of this region especially in Rio de Janeiro while its post war prospects depend on the extent to which Brazil continues to protect the sugar and alcohol producers.

There are a number of waxes and oils collected from the wild

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[11] Based on data from the National Bank—"Banco do Brasil." Relatorio de 1941, Banco do Brasil, S. A. Jornal do Commércio Rodrigues e Cia., Rio de Janeiro, 1942.

jungles of northern Brazil which have been on the increase because of war stimulated price advances and the difficulties of procurement from China and the East Indies in recent years. Castor beans have been grown to some extent in São Paulo with sharp changes in production as price changed. Tung trees are being planted in the hope that they will be able to compete favorably in the post-war period even if they begin bearing too late to be useful during the period of wartime high prices. Rubber, carnaubá wax and babassu nuts are produced only in the north.

The shortage of coal and the disappearance of natural forests has pushed the price of wood sufficiently high to induce a considerable expansion in commercial forests, primarily eucalyptus for fuel and low grade timber. It is usually planted on the steeper slopes or poorer areas of abandoned coffee, thus competing directly with pasture in the areas close to railroads and cities. Only six to ten years are necessary before they can be cut, and the stumps and roots may be left to produce a second, third and even fourth crop.

Wheat is imported in large quantities from Argentina to compete with a small tariff protected Brazilian wheat crop. More important than the tariff in reducing purchases from the Argentine has been the requirement that a specified percentage of manioc, rice or corn-flour be mixed with the wheat. The latter requirement has recently been abolished in exchange for Argentine concessions towards Brazilian erva-mate.[12]

Several other non-agricultural developments are of brief interest since they compete with agriculture for labor and open up prospects for a larger urban market for agriculture within Brazil. Production and exportation of minerals has expanded at a truly enormous rate. The out-of-state movement of minerals (in part to other Brazilian states and in part to foreign countries) from Minas Gerais has increased six times in both weight and value from 1930 to1940. Minas Gerais is the most important state mineralogically. A large steel plant is being constructed at Volta Redonda in the state of Rio. Other industries such as textiles and cement manufacture have been expanding, the latter under the stimulus of tariff protection.

Summary

The position of coffee in the agricultural economy of São Paulo and Minas Gerais has changed profoundly. Technical conditions

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[12] But has recently been established because of shipping shortages.

require that coffee land slowly be abandoned to other crops unless prices higher than in 1928 and 1929 are in prospect, while actual prices have been half this amount and in consequence have speeded up the process of abandonment. Since coffee constituted nearly three-fourths of Brazil's exports, the drop in coffee prices in 1931 coupled with domestic inflation forced a sharp depreciation of the milreis.

Cotton prices remained close to the 1929 levels and improved considerably relative to coffee. At the same time, a number of changes in variety patterns, grading systems, types of local gins and market practices considerably improved the production efficiency and quality of cotton. Cotton production increased several times between 1931 and 1938 but since that time has just about maintained itself. Production on large farms has been decreasing while that on small farms has been increasing. Unless new changes or even higher price ratios occur in the future, the increasing tolls of soil erosion, fertility depletion and insect losses are likely to slowly reduce cotton production in São Paulo.

Beef production is currently expanding largely because of favorable price relationships, coupled with the abandonment of coffee for technical and price reasons. The introduction of the Zebú cattle from India in the late nineteenth century stimulated increased beef production in the sub tropics but technical changes have been small in recent years.

Oranges have been expanding as a commercial crop since about 1925, primarily as the result of new varieties and better marketing methods. The export crop is grown near the seacoast on old coffee lands and pasture and is unlikely to affect the competitive relations between coffee, cotton and beef in the interior, although some increase in the interior is improving the poor dietary situation of the Brazilian agricultural workers. As soon as shipping becomes available exports of oranges are expected to be resumed to European markets.

Sugar and its alcohol derivative will be the subject of considerable post-war debate in Brazil. Motorists will not wish to use considerable quantities of alcohol with their gasoline, but the sugar interests will ask for action to protect the present expansion of sugar and alcohol plants on both economic and military grounds. Mandatory mixing of alcohol with gasoline appears to be the chief possibility for domestic usage, and will gain some public support

from desire to avoid a repetition of the serious gasoline shortage which Brazil is now experiencing.

There have been no important technological changes in the production of corn, beans, rice, hogs and dairy products, although some efforts have been made to develop crosses of Zebú with dairy type cows so as to increase tropical resistance and yet maintain a fair milk flow, and some hybrid corn is about ready for distribution. Price ratios with coffee have been less favorable than cotton or beef but have nevertheless stimulated some shifts in the older coffee regions. Price changes for these products are primarily related to the level of domestic employment and to the domestic inflation.

Some migration of labor has taken place between agriculture and the growing manufacturing and mining industries. There also has been movement of labor within the large farms as well as between regions from coffee to other agricultural products. The first of these has been accompanied by a shift from intensive cropping to extensive enterprises such as pasture or forests, while the second has been primarily a shift in the method of utilization of land and labor in agriculture.

The trends in operation in the São Paulo-Minas Gerais region of Brazil, economically the most important section of the country, suggest that a number of agricultural economic conflicts will become of increasing importance in Brazilian-American relations. Cotton production already has been arousing considerable discussion. This analysis suggests that coffee, the solid base of economic friendship between Brazil and the United States, is beginning to slide. Cotton is likely to change little or perhaps decrease in importance, unless price ratios are further shifted in favor of cotton as is being done now. Cotton, together with beef and oranges should be recognized as products which will be marketed almost wholly in Europe or Japan under existing United States barriers to trade. On the other hand, the possible use of alcohol as fuel would reduce purchases of gasoline from countries to the north and would increase Brazilian self-sufficiency. All these developments suggest that this area of Brazilian agriculture is becoming more independent of the United States and has been doing so during the past ten or twelve years.

A POST MORTEM ON COUNTY PLANNING[1]

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THE county planning program is buried. Whether the burial is a temporary war casualty or a burial in perpetuity is a matter of conjecture.[2]

Although the mores may not permit the exhumation of what is buried, nevertheless the social scientist is obligated to examine analytically the ideational culprits involved in the death march. The expenditure of a tremendous amount of human energy and money may not revert to the debit side of the ledger if an investigation of the county planning experience reveals basic fallacies in the program which may be avoided in the development of new programs. We must recognize, too, that county planning in reality may be buried but not dead. The possibility of a resurrection is not a fiction, particularly if post war activities necessitate a closer relationship between the federal government and smaller political units.

In consequence, this paper will probe certain major factors involved in the failure of the county planning program. By open minded criticism and continued revaluation only will governmental programs become dynamic. This paper does not attempt to bring forth any startling revelation concerning county planning; it is merely a deliberate attempt to analyze basic questionable considerations. It is necessary, however, before undertaking the analysis, to consider briefly, fundamentali mplications of the planning process. Such a conceptual analysis provides firmer footing for an examination of a specific type of social planning, namely, county planning.

I. *The Concept of Planning*[3]

The very essence of the planning process is foresight by some agency to project itself into the hazy future and establish the structure upon which this future will be built. The process of planning

[2] The recent wholesale discontinuation of the county planning activities of the Bureau of Agricultural Economics gives credence to this mortality statement.

[3] The concept of planning in society is not a recent development. Historically, a number of societies have practiced some form of planning. Ancient Egypt, Aristotelian Greece, Rome and China are examples in point. See P. A. Sorokin, Is Accurate Social Planning Possible, *American Sociological Review*, Feb. 1936, p. 12.

is thereby an anticipatory process, one in which the area of uncertainty is minimized.[4]

Although the planning concept usually connotes a temporal space of some precise length, this characteristic is not integral to the meanng of planning. The integral factor is well-ordered thought in which the end or ends have been clearly specified and pragmatic decisions reached concerning the choice of means within the limits tolerated by the existing norms. A clear perception of prevailing conditions is a further requisite for planning.[5] Thus, whether the action resulting from planning is to span fifty years or five minutes, the process is the same.[6]

Planning must further be distinguished from designing. A design implies a settled procedure; a plan denotes a proposed procedure subject to modifications to meet contingencies. This recognition of dynamism in the planning process is the theoretical differentiating characteristic between planning and designing. As the planners recognize indications of deviations from the anticipated course of events, they will modify and readjust their programs. In any planning process, there must exist a willingness to change planned programs from time to time to correlate more exactly to larger processes. Only adaptation and readaptation can finally effectuate the realization of predetermined goals.

Planning is further established upon the supposition that within limits the trend of events in the future can be controlled. This process is a recognition of man's belief in his ability to control his destiny. Even though the supernatural still may command homage, nevertheless planning gives credence to the belief that a certain sphere of human activity may be ordered by man.

Planning includes, too, the idea of prevention of problems besides the mere analysis and cure of existing problems. Through careful surveillance of trends, potential pathological situations may be avoided by overt attempts to change the course of future events and a more favorable environment for future action will be sought. This search for more favorable conditions in the time period to come encourages experimentation in opposition to stagnation. It embodies the notion that the untried may offer solutions to pre-

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[4] See Frank H. Knight, Risk, Uncertainty, and Profit, Part III, London Schools of Econ., Reprints of Science Tracts, No. 16, 1933.

[5] See Talcott Parsons, The Structure of Social Action, Ch. II, N. Y., McGraw-Hill, 1937.

[6] The decided differences resulting from the view of complexity are recognized.

vailing or potential undesirable situations. In sum, from the experience of the past, planning scrutinizes the present and the probable future for the purpose of creating an improved future.

County Planning. At this point it seems pertinent to correct an implicit error that one finds in county planning literature, namely that county planning was first inaugurated in 1938 with the Mount Weather Agreement. It is true that county planning was given great impetus with this declaration of unity and that official pronouncement of the planning committees as existing in 1941 was formulated there; however, we must recognize that the concept of county planning was not a sudden, new phenomenon.[7] In 1930, there were 67 county and regional planning agencies. By 1931 this number had increased to 79; in 1933 there were 76; by 1935 there existed over 300 county and regional planning commissions.[8]

It is further appropriate to notice the widening meaning of the concept "county planning" since the Mount Weather Agreement. Initially, the county planning idea represented a coordination program for the action agencies; then a land use planning connotation became the dominant note. Gradually, an expansion of meaning occurred to include the human element from the social viewpoint in agricultural planning. Finally, the concept has expanded to rural planning in toto, planning for all phases of rural society.[9]

After this preliminary treatment, let us now consider the four major problems of this paper: (1) the ultimate goal of county planning; (2) the unified concept of county planning; (3) democracy in county planning; and (4) the basic units of county planning.

II. *The Ultimate Goal of County Planning*

It is immediately apparent that the key to the analysis of any planning process centers upon the perception of the end or goal of that process. If we do not possess an understanding of the end involved, we cannot evaluate the program by which means are organized to attain the ultimate goal.

There have been a number of statements as to the final objectives

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[7] See W. E. Cole and H. P. Crowe, Recent Trends in Rural Planning, Ch. I., New York, Prentice-Hall, 1937, p. 17.

[8] It should be noted, however, that over sixty percent of these committees were unofficial and that many of them had been created to help carry through the emergency programs. Nevertheless, they were county planning agencies.

[9] For a clear exposition of the development of county planning see Ray E. Wakeley, Rural Planning, Its Social and Community Organization Aspects, a paper presented to Rural Sociological Society, Dec. 28, 1940, p. 5.

of county planning. In the Mount Weather Agreement, county planning was conceived of primarily as an attempt to draw the Department of Agriculture and the Land Grant Colleges and Universities more closely together.[10]

Another stated ultimate goal seemed to be that rural planning would represent the true democratic process.[11] In a 1940 announcement, the Bureau of Agricultural Economics issued a statement in which the goals of Agricultural planning were stated as "a composite of the stated ends, goals, and objectives of all agencies and organizations interested in the welfare of farm families."[12] From another approach, Ryan considered the ultimate objective to be the creation of a new social structure in rural America, and thus not merely economic reform.[13]

At any rate, a rather extended analysis of the literature of county planning indicates the following goals as the ultimate ends of county planning: (1) that county planning was to be essentially a coordinating activity of various agencies to form an integrated program to solve specific farm problems; (2) that it was a democratic process whereby the farmer would be able to participate in this coordinated program; and (3) that county planning intended as its main and final objective the creation of higher levels and standards of living for the farmer.

However, let us study the implications of these goals as stated. On the surface they seem quite reasonable and sound. Yet, a closer scrutiny reveals that these objectives could not be realized unless a deeper teleological concept was understood. The stated objectives assumed that by a mere coordination of the programs of the several agencies involved in rural America and by giving farmers representation in this cooperating scheme, county planning would automatically create solutions to welfare problems. However, it is the central thesis of this paper that county planning did not succeed because no desire to solve community and county problems was created in the population of the area in which the county planning program was to function. A program such as county planning must

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[10] Association of the Land Grant Colleges and Universities and the United States Dept. Agr., Joint Statement on Building Agricultural Land Use Programs, July 8, 1938, p. 1.

[11] United States Dept. of Agrc., The Scope of Land Use Planning, County Planning Series, No. 4, p. 1.

[12] Bureau of Agricultural Economics, Preliminary Statement on Goals of Agricultural Planning, April, 1941, p. 1.

[13] Bryce Ryan, Democratic Telesis and County Agricultural Planning, JOURNAL OF FARM ECONOMICS, Vol. XXII, No. 4, Nov. 1940, p. 691.

be conceived of as an art in which the ultimate end focuses upon creating self-help. The reasoning in this analysis centers on the truism that the experts can work out beautiful expositions of problems, they can present exclusively alternate solutions, but unless a self-interest to achieve those results is established, the expensive work of the expert has little or no value.

County planning must be established from the bottom up; it cannot and will not function as democratic county planning from the top down. A planning program will not succeed unless the people want it to succeed. This primary goal of county planning has been relatively neglected by the administrators of county planning, despite utterances to the contrary. Most administrators of county planning conceive of rural planning as another administrative problem, as a procedure. However, they must conceive of it as a process, the end result of which will be a determination by rural people to accomplish something for their county or community. In short, the ultimate objective of county planning should not be the solution of certain immediate problems; it should be to develop a community determination to solve problems. Thus, the removal of pathological conditions is secondary; the establishment of an avid desire, a self-help philosophy, is primary.[14]

The planning concept denotes an arrangement of means for the attainment of some end; but unless the proper milieu is created for this planning process, there will be no process—but a hodge-podge of lofty ideals that will remain ideals and never ripen into reality. Again, even if the position were tenable that problems could be solved temporarily by the mere collaboration of experts with the aid of laymen, these problems would certainly not remain solved but would shortly relegate to the same problems or create a new myriad of problems.

A recognition that all was not well in the county planning process in the various counties of Iowa was shown by the summation report of the fiscal year ending June 30, 1941. Professional workers attributed this unsatisfactory state of conditions largely to the dearth of lay leadership in the counties.[15] This attributing of poor county programs to the lack of leadership seems to tie in with the analysis

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[14] From this emphasis upon this community "state of mind" it does not follow that the community necessarily must consider only provincial matters. In fact, it should be noted that many rural communities are fully capable of considering national problems.

[15] Bureau of Agricultural Economics Progress Report, op. cit., p. 35.

expounded in this paper. Thus, according to this observation *where there was no motivation* by a trained leadership (i.e., no desire created of self-help and no virile attitude toward community problems aroused), it seemed that the county planning process bogged down.

Consequently, one may be able to show the farmer what to do, and even how to do it, but the fundamental point is that we cannot do it for him if a permanent planning process is to be established. Unless this paramount basis of effective county planning is envisaged, unless the near-sighted status quo objectives are subordinated to this more fundamental goal by the administrators of county planning, any county planning process is doomed to failure. In short, this truism constitutes a gigantic log jam under the framework of county planning.

The implications of this presentation are immediately obvious. First, the administrators of county planning must be made aware of this deep-rooted, ultimate objective of their work. It should be clear that this objective does not have to be ultimate in the temporal sense, but ultimate in the theoretical initial approach to the problem, and ultimate in that it will be the most important resulting phenomenon of the planning process. Second, the emphasis on intensive county planning work in one county must be furthered as opposed to extensive, superficial planning. Third, intensified educational campaigns must be initiated in the counties in which the process will be applied. Fourth, agencies of the federal government should agree to cooperate only with those counties where a definite self-help attitude exists as evidenced by some external manifestation or formal documentation.

Consequently, all planners—even the specialized specialists, must perceive this ultimate objective and shape their particular contributions toward this final goal.

III. *Unified Concept of County Planning*

A second fundamental criticism of the existing concept of rural planning flows from the first major objection. After the theoretically fundamental objective of county planning has been realized, the governmental specialists and the rural group must view the actual problems to be solved in the full realization of their interrelationships.

The essence of this criticism is that county planning must not be conceived of fundamentally as land-use planning, labor problems,

tenancy planning or any type of isolated planning. It must be thought of secondarily in terms of accomplishing a unified objective, namely a better life and higher standards of living for the rural family.[16]

The government specialists in the field of county planning have perhaps been the most guilty in this lack of perceiving the unity of the planning process. The land-use economist, the soil expert, the sociologist, and other experts interested in specific phases of county planning have plunged into county planning as specialized specialists with no apparent concern for anything besides their own technical problems. They seemingly have no ultimate view of the entire structure of which they are a part. They see the parts; they do not see the whole.

If rural planning is to be successful, it follows that these specialists with their important role in county planning, namely to produce the factual data on specific problems and offer workable solutions based on their experience with similar problems elsewhere, must yield their narrow concepts into a broader, unified view of what the specialists are aiming at in toto. Then, and then only, will the specialist realize that he is not just attacking another problem, but that he is a vital part in the process to achieve the fundamental goal of planning, namely the desire for self-help[17] in the rural community, and thereby, the secondary goal, to obtain a higher level of living for the farm family.

This problem assumes tremendous importance when we call to mind the expensive growth of county planning since its inception. From land use planning, the process was enlarged to such an extent that it developed into rural planning in the full manifestations of the term. With its continual enlargement of special matters dealt with, it became necessary to call in more and more experts to help analyze specialized problems. With this continued splitting up process, the terminology became more technical, the number of experts with specific interests increased, and recognition of the primary and secondary purposes became blurred or completely lost in the maze of technicality.

The unified pattern of the rural planning concept must be understood for another important reason, namely that changes in the

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[16] The primary goal still remains self-help. The unified concept is secondary in that it flows from the major objective.

[17] Self-help in this sense of course connotes a communal attack on problems rather than an individualistic appoach.

culture pattern of a group usually produce concomitant changes in other segments of the cultural milieu. Rural society is no longer a simple, sacred society. Rural society is a complex society, even though the complexity is on a relatively low level compared to the highly urbanized metropolis. Changes in land use programs may result in shifting of farm families which may result in changes in the rural institutions of the school and church. The interrelationship of the institutional framework is an elementary sociological concept.

However, the specialists are not the only group whose thoughts must be reoriented along these broader and fuller lines. The farmer, too, must see this unified concept. With a myriad of governmental agencies and various types of specialists circumscribing him in his own native environment and at the committee meetings of planning sessions, the farmer cannot help at times to resent the encroachment of so many experts unless he can grasp a single, distinct understanding of their purpose. The writer recalls talking with a number of representatives from county planning committees at the 1940 meeting of the American Country Life Association meeting at Purdue University. These leaders in the county planning movement expressed a marked concern over what they conceived as a superimposition of many programs by variegated agencies in their county. These leaders presumably had no fundamental understanding of the secondary concept involved in county planning. Their conception of county planning may be pictured as:

Land use

   Conservation   Religious

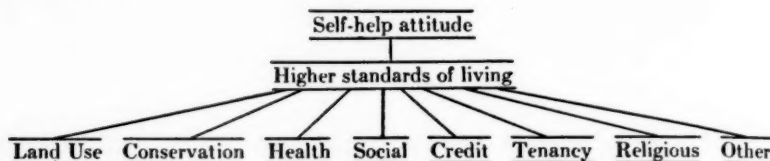 Health   Credit

    Tenancy

  Social   Other

There seem to be no clear understanding of the interrelationships of the various aspects of county planning. However, a clear, functional picture would be:

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                    ┌─────────────────┐
                    │ Self-help attitude │
                    └─────────┬───────┘
              ┌───────────────┴──────────────┐
              │   Higher standards of living  │
              └──────────────────────────────┘
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Land Use	Conservation	Health	Social	Credit	Tenancy	Religious	Other

This clarity of purpose was not understood by the farmers, experts, and administrators connected with rural planning. They did not understand that in reality they all were working for the same objectives only through different channels and approaches.

IV. *Democracy in County Planning*

A third basic criticism centers upon the democratic process in county planning. There is little doubt that one of the original motives of county planning was the creation of the democratic process in rural America. M. L. Wilson, in considering the democratic aspects of the county planning program, wrote, "We must battle for a renaissance of democracy and for new democratic patterns in farm life and in the rural community."[18] The Department of Agriculture conceived of the program as a national attempt to make democracy function throughout all of agriculture and as the mechanism whereby the rural people would become active in government.[19] The entire program was developed on the presupposition that democratic spontaneity would prevail.[20] Therefore, it seems evident that the democratic process was to become an integral part of the planning process. In the county planning process, democratic methods were to be obtained by the following methods:

    A. Election of community committees:
        (1) Each community, in open meetings or by mail ballot, elects a community committee, preferably with one representative from each of the smaller neighborhood groups in the county.
    B. Election of county committees:
        (1) The community committee elected chooses, by vote, one of the farm members to serve on the county land use planning committee.

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[18] M. L. Wilson, Land Policy Review, Jan.–Feb., 1939, p. 2.
[19] United States Dept. of Agr., Scope of Land Use Planning, County Planning Series; See also Bureau of Agricultural Economics, Communities and Neighborhoods in Land Use Planning, County Planning Series, No. 6, p. 1.
[20] Ryan, op. cit., p. 698, pp. 7–8.

(2) Each community, in open meeting or by mail, elects directly one of its farmers to represent it on the county committee.[21]

However, did the democratic function occur in county planning? Under the planning program as set up a virile and democratic process could not function. By a true and virile democratic process is meant a process actually representative of the rural population of the area. But the county planning program was not fully representative of the area. This proposition will be supported by three arguments: (1) County planning represented only a part of the county; (2) The method of initial organization represented an undemocratic process; and (3) The lower socio-economic groups were not adequately represented.

(1) Rural planning represented only a part of the county. It has already been demonstrated that the prevalent concept of county planning represented essentially a problem program rather than an attempt to establish a self-help attitide in the area. If the people in an area did not desire to help themselves, they a priori had little interest in the selection or the election of candidates representing their fictitious desires. Thus, the elected candidates[22] were in reality representative of the few because of the apathy of the many.

One needed only to talk with representatives of the several agencies engaged in trying to "enforce" the county planning program to recognize how ubiquitous this condition was. Thus, interest groups such as national farm organizations railroaded the members of county planning committees in many counties. The democratic process was weakened by the activities of certain national organizations.

This matter is of prime importance. Let us pursue it a little further. County planning was presumably a democratic practice. Rural planning had been established with the county as the real functioning unit. The rural counties of most states were under the control of one farm organization; in Iowa the Farm Bureau was most powerful. For simplicity in our analysis, let us restrict the discussion to Iowa. Our conclusions are applicable to the other states with similar organizational power situations.

With control of the county organization in Iowa, it represented but little effort to elect the members of the community and county

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[21] Bureau of Agricultural Economics, Membership of Land Use Planning Committees, County Planning Series, No. 2.

[22] It should be noted that in many instances the candidates were not elected but "appointed."

committees because of the control existent before the county planning was instigated. Thus, what happened was that the county planning committee merely became the representation of a particular group; in Iowa, the Farm Bureau.

But under the American way of life pressure groups are tolerated; in fact many of them are encouraged. From this point of view the Farm Bureau could not be condemned. However, the Farm Bureau represented only a segment of the highest socio-economic element of the State of Iowa. Thus, from this view the Farm Bureau was functioning in an undemocratic manner and necessarily must be condemned. This paradox is not easily solved; but it can be resolved. The solving of the paradox lies in creating initially a dynamic, active self-help group, the first consideration of this paper.[23] Consequently, unless this psychological frame of mind can be established among the constituents of the area, it becomes superfluous and ridiculous to term county planning a democratic process.

(2) The method of initial organization of county planning committees represented an undemocratic process. Those cognizant of organization techniques understand the importance of the initial temporary committee. It is not unusual for the temporary committee to become the greater part of the permanent committee. In setting up the temporary committee we find that one of the following procedures was used:

(1) The county agent selects the farmer members of the county land use planning committee, subject to the approval of local representatives of action agencies who are serving as ex officio members of the county committee; or

(2) The county agent selects the farmer members from a panel nominated by the other members; or

(3) Each non-farmer member selects one farmer member and additional farmers are selected by the county agent to insure that all important groups are represented; or

(4) The non-farmer members jointly select the farmer members.[24]

Let us analyze these four procedures. Our main objection to the first method is that the county agent with the local action agencies takes the initiative in establishing the planning committee. Anyone who has worked with the farmer recognizes that the county agent

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[23] This is not necessarily a perfectionist view. The point is that the ultimate goal as stated must be continually aimed at.

[24] Bureau of Agricultural Economics, County Planning Series, No. 2, p. 8.

usually forms amiable relations with only a small part of the population of the county. The relatively large number of farmers per square mile in some areas is an important factor in this situation. The county agent is usually a much discussed but little agreed upon person. Besides, the county agent received half of his salary from the Farm Bureau in such a state as Iowa and unless he succumbed to the will of the Bureau, he knew that he could be easily ousted from his means of livelihood. Obviously, this is not the type of environment conducive to democratic procedures.

Further, by the action agency representatives being invested with the final approval of the selections for the temporary committee, the action agency representatives were awarded a position of too much importance. The psychological results of such a procedure are devastating to the democratic process. The agency representatives had given final approval to the committee; therefore, the committee members assumed a subordinate position to the agency men. Consequently, the burden of the whole initial activities in starting the program were thrown back on the agency representatives.

Allowing the county agent to select the farmer members from a panel nominated by the other members (procedure 2) is objectionable on the same grounds as demonstrated in the criticism of the county agent as the instigator of the process (procedure number 1).

In analyzing procedure number (3) the question immediately arises, "What right has the non-farm member to select the farm member if county planning is primarily for the farmer?" The actual organization should be undertaken by the farmers themselves with perhaps advice and guidance by the agency representatives. But certainly, if county planning is going to be a process managed and controlled by the farmer, give the farmer the reins at the very moment the process begins with no strings attached.

Further, the objections against the county agent still hold in this procedure. Then, too, this method presumed that all important groups are to be represented. What of the unimportant, minority groups? Are they to have no representation? If this was to be a thoroughly democratic procedure, then these groups, too, must be represented. The objections to allowing the non-farmer members jointly to select the farmer members (procedure number 4) are the same as those levied at the non-farmer members in procedure number (3). Consequently, we see that under the methods of

initiating the county planning process, the whole program was undertaken in such a manner that undemocratic practices were instituted with their ruinous psychological effects.

One method whereby some of these objections might be alleviated would be to call a meeting of the people in the area after an intensive propaganda campaign for county planning had been completed. Then, a temporary committee could be elected from the rural folk in attendance. Thus, the organization committee would immediately be started on the right foot in a most democratic procedure instead of being overshadowed by governmental agency representatives.

(3) Under the methods utilized in county planning, the lower socio-economic elements were not adequately represented. After the preliminary goals are established, the planning committee will deal with certain specific problems. These problems ultimately deal with parts of the population of the lower socio-economic status. If the planning process is to be thoroughly democratic, then all elements of the population must be represented. That the desires and thoughts of these lower strata people be expressed seems vital to a true functioning concept of democracy. In fact, these people especially must be imbued with the idea of self-help not only to obtain representation but also to assure the success of any reform measures undertaken as part of the planning process. This vital issue of paramount importance to the success of the planning process received scant attention by the county planning experts.

This is a problem of morale; one in which the social psychologist must be asked to make his contribution. In the formation of ideas about county planning in the inner chambers of the high administrative officials, there definitely was needed a group of people who understood the principles of social psychology. That a woeful ignorance of this most imposrtant field existed in these super planning circles was most obvious.[25]

Consequently, because county planning represented only a portion of the county, because the methods of initial organization were undemocratic, and because the lower socio-economic groups were not adequately represented, the county planning process was not democratic. In discussing the democratic process, it seems appropriate to analyze the role of the specialist. Where does the specialist fit into the picture?

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[25] The inherent difficulties of any administrative program are recognized. It is still maintained, however, that the objection is valid.

It has already been shown that the specialist must discern the ultimate and secondary goals of county planning already expounded. Further, he must act purely in an advisory capacity. His duty consists in presenting facts that are requested, presenting alternative solutions to problems, and acquainting the committees with how other areas have successfully attacked similar problems.

The specialist, however, should not be the planning committee as such or any integral part of the actual planning committee. His position should be a subordinate one, and he should realize his position. If this relationship is not recognized, then we have not democratic planning, but bureaucratic planning.[26] It is interesting to note the percentage of government representatives of the total committee memberships in Iowa. More than one in every four (465 out of 1,734) committee members was a government representative. This result does not agree with the concept of the government agent's place in county planning as proposed in this paper. The specialist should constitute the searcher, the fact-finder, the suggester, but under most circumstances, not the doer. The establishment of these relationships is fundamental to a workable and democratic kind of rural planning.

V. *The Basic Units of County Planning*[27]

Another pertinent consideration has to do with the basic unit of rural planning. This problem is not a simple one, and we cannot be satisfied with merely establishing the periphery of neighborhoods and communities.

The writer does not care at this particular time to enter into a discussion of the ambiguity' surrounding the definitions of such words as neighborhood and community. Any good test in rural sociology will adequately demonstrate this lack of agreement. However, it does seem reasonable to postulate that rural planning will be most effective if the area in which the planning is to take place is a highly functional area, i.e., one in which most functions take place and the one in which the greatest number of people can be aroused.

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[26] No value judgments are intended. Bureaucratic planning may be more efficient or it may not. But it is the assumption here that the creators of the idea of county planning thought along lines of democratic means.

[27] For an excellent analysis of governmental administration and local groupings see Charles P. Loomis and Douglas Ensminger, Governmental Administration and Informal Local Groups, Applied Anthropology, January, 1942, pp. 41–59.

The first point that must be clearly recognized is that there can be no single pattern for the primary unit in rural planning. Different areas necessitate different types of units. Whereas the township might function in Iowa, it would certainly not succeed in North Dakota. The scatter of population alone validates this condition. Besides, different areas have different interests and different problems. In some areas one will find that each neighborhood has specific problems due to local peculiarities. In other areas a half dozen or more townships may have the same paramount interests. This factor is exceedingly important because people function most efficiently and most spontaneously in a group with similar interests.

If we accept this contention, then we immediately implicitly admit that the legal delimitations of present rural planning possess little value. If we push this point to the extreme, we must admit that state planning, too, constitutes a fictitious and superfluous unit of rural planning. What then shall these units be? The answer to this query flows from recognizing our assumption in establishing the "most interest area" as the primal concept. The larger units of rural planning should be "larger interest groups." Thus, we may term the unit divisions of rural planning as regional, subregional, and sub-sub-regional with the sub-sub-regional division equalling the smallest unit, the face-to-face unit or primary contact as enunciated by Cooley.[28] Excellent work has been done by Mangus and Odum in establishing regions and sub-regions.[29]

Several advantages are immediately evident from such a structural system of rural planning:
(1) This changing into an interest area regionalism would minimize the influences of local vested interests such as farm organizations and local politicians;
(2) It would free rural planning from the dictates of the county administrative units;
(3) An interest emphasis would be clearly revealed by the very structure of rural planning; and
(4) It would force the specialized specialist and the farmer to think in terms of an active and real interest area rather than

        [28] See Cooley's analysis of primary groups in his classic declaration of differentiation of primary and secondary groups in Social Organization, N. Y., C. Scribner's Sons, 1929.
        [29] See A. R. Mangus, Rural Regions of the United States, especially chs. 3, 4, and 5 (Works Progress Administration Monograph, Washington, U. S. Govt. Printing office, 1940), and H. W. Odum, Southern Regions of the United States, Chapel Hill, Univ. of North Carolina Press, 1936.

in terms of a fictitious interest area and thereby would place an emphasis upon the interrelated aspects of the program.

That rural planning as county planning has bogged down is all too obvious. An important reason for this slackening is that county planning rests on a weak structure, weak from the standpoint of interest in county planning. Thus, if the several communities in the county, and more fundamentally, the many neighborhoods in the area, are not interested individually in rural planning, then we cannot expect to find a miraculous and sudden interest in county planning by the population of the area after the county planning committee has been formed. In other words, the least divisible unit of rural planning must be sold on rural planning, if the larger units (made up of sub-units) are to be animated groups. In short, it reverts back to the old commercial axiom, "start small, then enlarge, don't start large and then become small." The rural planning specialist must fully comprehend this most important rule of organization work.

Thus, the county was selected by the planning specialist as the functioning unit because it provided an easy administrative unit for rural planning. But interests and not administrative facility must be the criteria of the unit of rural planning. Therefore, these actual interest regions with their sub- and sub-sub-classifications must be delineated by planning technicians. Mangus's work thereby must be extended.

Therefore, concerning the unit of planning, it has been maintained:

(1) That interest must be the primary consideration in establishing the basic units of rural planning;

(2) That there is no static pattern for the sub-sub unit;

(3) That the county must be discarded in many areas as the functioning unit of county planning, and

(4) Finally, that regional, sub-regional, and sub-sub-regional units may constitute a solution to this problem.

Conclusions

Our general conclusion is that county planning did not result in the democratic, alive process envisaged by the originators of the concept. It relegated to merely another procedure, not a process, of the specialists of the state colleges and administrators of the Department of Agriculture.

The whole structure of the program was erected on a weak and flimsy base. No clear understanding of the ultimate end of the planning process was envisioned and no differentiation perceived between intermediate and ultimate goals. The county planning program did not constitute a unified program; the specialists could not recognize a configuration in which their efforts were only a segment. A digestion of Parson's[30] means-end scheme is heartily recommended to the initiators of such programs.

The reasons for the early mortality of this large governmental experiment center around the superficiality of the program. The burden of the program was placed too one-sidedly upon an administrative organization and personnel. The populations which the program was supposed to serve never really understood what county planning was all about, and a spirit of self-help was never created in the counties. And then the planning experts were amazed to discover that the natural diffusion process which they had anticipated did not materialize. They neglected the observation that in a democratic society a program which is forced and "clamped" upon areas has little probability of success. The psychological fact that people do best what they want to do and that people will not do what they have no desire to do was never recognized.

At any rate, county planning is at the present time buried. However, if and when it is exhumed, it needs a thorough going over by keenly analytical, unbiased successful planning specialists. It may be that exhumation is out of order and that the whole philosophy behind the initial idea has little merit. However, if a resurrection is attempted, the following recommendations are made to the physicians (or clergy) in charge:

1. The administrator of county planning must be made cognizant of the ultimate goal of his work.

2. The emphasis should be on intensive work with the functional units rather than on extensive work with more political units.

3. Intensified, well-organized educational campaigns must be initiated in the area of the planning activities. "Interest" does not exist like a brick or a house. It must be aroused, diffused, and molded.

4. The governmental agencies should agree to cooperate only with those areas where self-help attitudes exist.

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[30] Parsons, op. cit., pp. 43–85.

5. The administrators of county planning must be made aware of the interrelated aspects of rural planning. The United States Department of Agriculture should employ several planning experts to visit the states and impress upon the administrators and the specialists this unity of purpose.

6. Obstacles to democratic planning exist not only in the administrative organization, but also in the social pattern of the population.

7. The method of initial organization of the primary unit should be changed. "Elective" is not synonymous with "democratic." The initial organization should be more nearly representative of the local group.

8. The specialist should be made cognizant of his purely advisory capacity.

9. Much consideration should be given to the structural unit of rural planning. Interest should be the basis for the selection of the units.

WHAT IS A MINIMUM ADEQUATE FARM INCOME?

LLOYD H. FISHER
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PROMINENT among the needs of planning groups in agri-
culture has been some valid answer to the question of what
constitutes the minimum adequate farm income. The answer has
frequently rested either on authority or expediency. To many it has
appeared a moral issue and, therefore, not susceptible of rational
or empirical solution. To others it has seemed to belong to the
specialist—the home economist and the budget expert.

However vexatious the problem, it is nevertheless inescapable.
Without some reliable solution there is no adequate objective for
many farm programs, no satisfactory answer to the subsidiary
questions of what is an adequate size of farm or what is an economic
unit. The approach most widely employed is that of the budget
which specifies that an expenditure of a given number of dollars for
food, clothing, housing, recreation, education, etc. is the least ex-
penditure for which an adequate supply of these commodities can
be obtained. These expenditures added together yield a sum which
is thought of as a minimum adequate income.

Such budgets rest on slight scientific or pragmatic foundations.
The exception is, of course, food. In the instance of nutrition more
valid scientific standards of adequacy of diet have been developed
and are in current use. There is no lack of specifications on what
constitutes adequate housing but these specifications are in the
nature of a trade agreement among professional housers and depend
more on unanimity than on evidence. In the matters of clothing,
recreation, and education there is not even unanimity.

An equally serious objection to the budget procedure concerns
the technique employed. The householder's problem is one of
choice in the distributing of a given income. The technique he em-
ploys is one of preference or substitution. The budget experts'
arithmetic is based on addition. Customarily an adequate income is
the sum of a series of expenditures in adequate amounts for pur-
poses considered proper or necessary. At almost every step moral
issues intrude. We have to deal not only with whether one or two
suits of clothes are sufficient, whether one movie a month is essential
and two are excessive but whether an allowance should be made for
tobacco, liquor, and a better automobile. It is obvious that if
provision is not made for certain of these wants which may on moral

grounds be thought to be better suppressed, they will be satisfied at the expense of morally unexceptionable wants. Tobacco inadequately provided for will be bought out of money budgeted for food. Liquor will sometimes be preferred to running water. Consequently it is inevitable that it will cost more to realize an adequate level of living than the sum of the expenditures that will provide it.
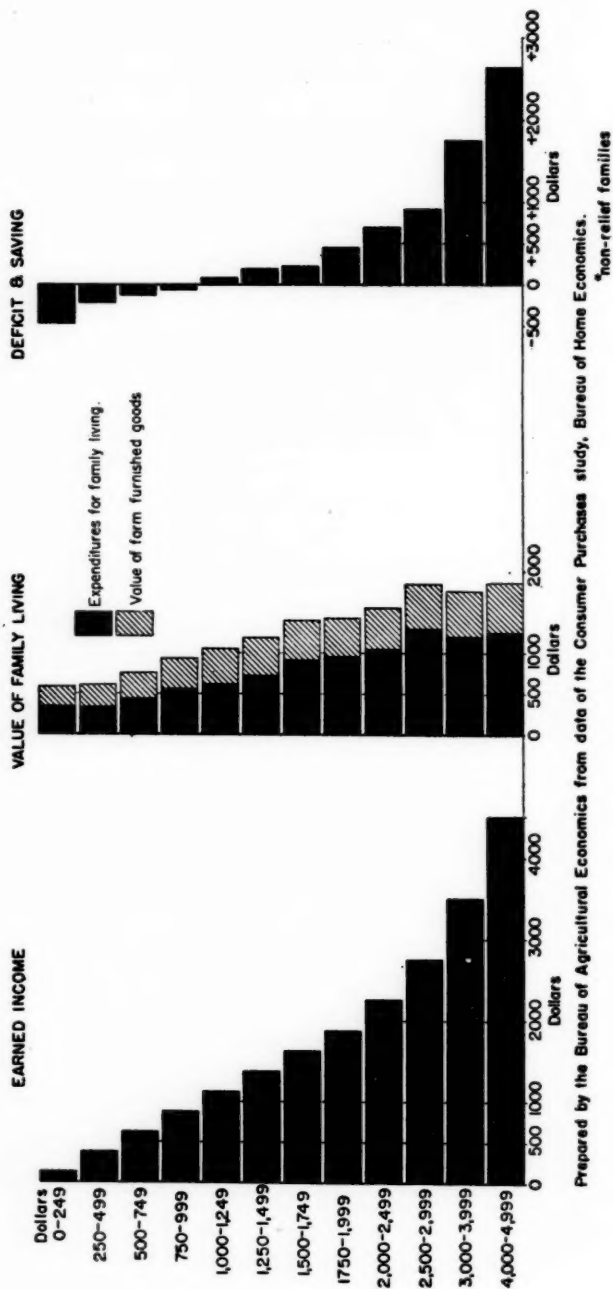
There are many who will argue that society has no responsibility for the irresponsibility of its members—that it must proceed on the assumption that its members will behave prudently according to the majority definition of that term. If liquor competes with running water in the value system of any consumer so much the worse for him. However comfortable this position may be morally it will not secure a more provident expenditure of income.

The intention of this article is to propose an alternative procedure which is free from these objections. It has its own shortcomings but these are on the whole less serious than those of a prescriptive budget. There are now available, for many sections of the country, the results of the Consumer Purchases Study conducted in farm areas and small towns by the Bureau of Home Economics in 1935 and 1936. This study has yielded an unparalleled wealth of data on patterns of consumption in relation to income and has provided for the first time a broad empiric basis of determining the choices and decisions that consumers make with reference to their own incomes according to their own wants.

The present study owes its origin to the Columbia Basin Joint Investigations. The purpose of these investigations is to plan the development, settlement, transportation, and general economy of an area of about 1,200,000 acres of land to be irrigated in the State of Washington from the waters of the Columbia River. Settlement at present is very sparse, confined to a few large wheat farms and a small acreage of irrigated land. The conversion of this large semi-arid area to irrigated farming will involve a complete transformation affecting virtually every aspect of life within it.

The Columbia Basin Joint Investigations, in order to reduce the problem to manageable terms, recognized 28 component problems, which although not unitary, were sufficiently discrete to permit separate consideration in the initial phases of the investigation. One of these was the determination of the levels of living that should be sponsored in the establishment of new farms in the Columbia Basin. The Division of Farm Population and Rural Welfare of the

INCOMES, VALUE OF FAMILY LIVING AND SAVINGS, 948 NATIVE BORN FARM FAMILIES* IN OREGON AND WASHINGTON

EARNED INCOME

VALUE OF FAMILY LIVING

DEFICIT & SAVING

Dollars
0-249
250-499
500-749
750-999
1,000-1,249
1,250-1,499
1,500-1,749
1,750-1,999
2,000-2,499
2,500-2,999
3,000-3,999
4,000-4,999

Expenditures for family living.
Value of farm furnished goods.

Prepared by the Bureau of Agricultural Economics from data of the Consumer Purchases study, Bureau of Home Economics.

*non-relief families

Fig. 1

Bureau of Agricultural Economics agreed to examine this problem and attempt to devise a method whereby these objectives might be determined and expressed as an income level which might in turn influence the types and sizes of farm recommended for the area. The discussion that follows is in partial fulfillment of that agreement.

The Columbia Basin Joint Investigations no less than other planning ventures in agriculture found it necessary to deal with minimum income objectives for farm planning. The method used to determine these objectives was almost the obverse of the family budget approach. It was assumed at the outset that there was in every family's disposition of its income a competition between saving and spending. It was further assumed that saving would not appear as an important element in this allocation of income until the minimum requirements of family living, as the family defined these requirements, were met. It followed, therefore, that there ought to be an income level below which the characteristic of income groups would be an excess of expenditure over income and above which there would be an excess of income over expenditure. The results for a sample drawn from 948 full-time, native-born, farm families operating small general farms in the Pacific Northwest are shown in Figure 1.

There are two points of particular interest in the chart. The first of these is the income level at which income and expenditure approximately balance. This is the income class $1,000 to $1,250. The second important observation is the plateau in expenditures which is reached at the income level $2,500 to $3,000. Beyond this point all additional income is saved or, more precisely, little or no additional income is spent for family living.

The first relationship—the point of balance between income and expenditure—might well set a lower limit on income objectives in agricultural planning. It would hardly be defensible to aim at an income level at which the average experience is one of deficit. Again, although this may not be so readily agreed to, the second relationship might well set an upper limit. For at an income of $2,500 to $3,000 all immediate income needs are provided for and substantial savings occur as well.

There still remains a wide range between the $1,000 level at which balance between income and expenditure is achieved and the $2,500 level at which spending for family living ceases. Somewhere

in this range the income objective lies. Presumably an income level of $1,000 to $1,250 would not be sufficient since balance is only an average achievement of the income class and a substantial proportion of the members of the income class will fall below. A policy which aimed at this minimum would at the same time preordain the failure of many of those it proposed to help.

TABLE 1. FARM INCOME AND SOLVENCY

Income	Solvency rate[1]
Dollars	*Per Cent*
Under 500	9.0
500– 749	29.6
750– 999	52.0
1,000–1,249	70.3
1,250–1,499	80.7
1,500–1,749	78.3
1,750–1,999	85.0
2,000–2,499	92.0
2,500–3,000	95.0
3,000–4,000	97.8

[1] Solvency is used here to mean an excess of income over expenditure. The data in this column are derived from the Consumer Purchases Study of 948 full-time nonrelief farm families in the Pacific Northwest.

Table 1, derived from the Consumer Purchases Study in the Pacific Northwest, presents for the several income levels the proportion of families which, in terms of actual behavior, have lived within or beyond their annual incomes. From this table it becomes possible to predict the effect of any income on the solvency of a group of farm families conforming to the general characteristics of the sample. Thus, if income is less than $500 it may be anticipated that more than 90 percent of all farm families will fail to live within that income. If income rises to the next level, $500 to $749, the casualties drop to 70 percent. At an income of $1,000 to $1,249 only 30 percent of all families will live beyond their incomes. As one might expect the proportion of casualties declines steadily as income rises. There is a single aberration on the series, occurring at the income level $1,500 to $1,749, where the proportion of insolvent families is actually higher than at the preceding income level. This can only be ascribed to a sampling error and it must be assumed that had the sample been larger the irregularity would not have occurred.

The next step is the application of these solvency rates to a

specific planning situation. One of the problems of the Columbia
Basin Joint Investigations is the allocation of, let us say, 100,000
acres of land to a number of dairy farms, and our problem is to de-
termine how many farms this area can best accommodate while
preserving an acceptable standard of living and at the same time
maximizing the total social gain. Obviously, income varies with size
of unit. The farm management specialists working on the Columbia
Basin Joint Investigations have furnished a series of budgets based
on the analysis of established dairy farms in neighboring areas
where conditions are similar to those anticipated for the Columbia
Basin.[1] In these budgets all factors apart from size were held as
nearly constant as possible and the probable income available for
family living was calculated for a 40-, 60-, 80-, 100-, 120-, and
160-acre dairy farm.

On the assumption of an area of 100,000 acres to be distributed
among an unknown number of farms, Table 2 provides the elements
whereby the determination can be made. If farms of 40 acres in size
were established, the total area would yield 2,500 farms. The prob-
able annual income available for family living would be $875. But
only a little more than half of all farm families with incomes of $875
may be expected to remain solvent at that income. Consequently,
of the 2,500 farms which could be established at 40 acres, 1,300
would be solvent and 1,200 insolvent, yielding a net social gain of
only 100 solvent farms.

As farm size is increased, the total number of farms decreases,
the family income increases, the solvency rate increases, and the
total number of both solvent and insolvent farms decreases. The
essence of the method proposed here lies in the fact that the number
of solvent farms has a different rate of decrease than does the num-
ber of insolvent farms. Thus an increase in farm size from 40 acres
to 60 acres results in a decline of 128 in the number of solvent farms
while the number of insolvent farms declines by 705. If the problem
at hand were to maximize the number of solvent farms the obvious
choice from Table 2 would be farms of 40 acres yielding incomes of
$875. However, this also maximizes the number of failures. There
will be no disagreement with the proposition that the objective of
farm planning is to minimize failure as well as maximize success. It

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[1] For final determination of farm size in the Columbia Basin, somewhat more
refined estimates, based upon crop and livestock yields anticipated for the Basin,
will be used.

INCOME, SURPLUS AND DEFICIT. 948 NATIVE BORN FARM FAMILIES*
IN OREGON AND WASHINGTON
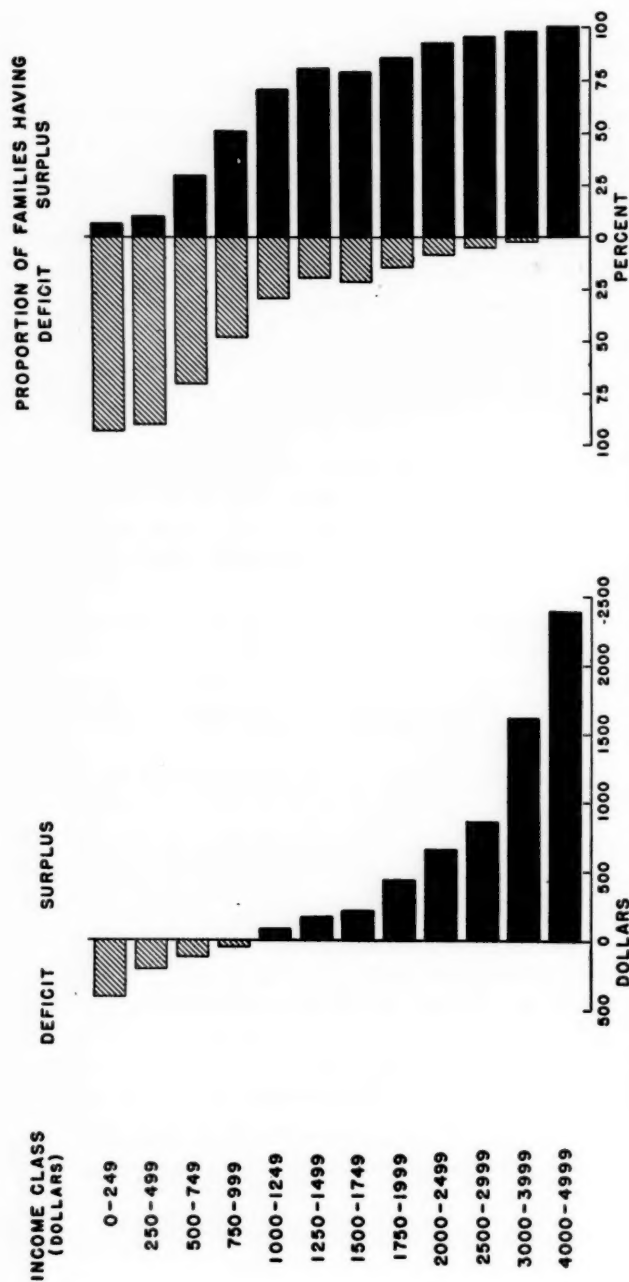
Prepared by the Bureau of Agricultural Economics from data of the Consumer Purchases study, Bureau of Home Economics.
*non-relief families

Fig. 2

is not always clearly understood that the one is not a necessary function of the other.

If we are willing to consent to the assumption that a failure counterbalances a success we can take the final procedural step and calculate the net number of solvent farms. The problem then resolves itself into determining the size of farm and consequent income at which the maximum net number of solvent farms is realized. This can be read easily from Table 2 as an 80-acre farm yielding an income of $1,312. The 100,000 acres which the hypothesis stipulated will then yield 1,250 farms.

It follows, then, that the largest net number of solvent farms is achieved at an income level at which 20 per cent of all farms are insolvent. These must be reckoned the probable casualties of a utilitarian goal.

There are refinements which might profitably be introduced. The data on which this analysis is based are records of a single year's income and consumption. It would be far better for the purposes of this procedure if the record had covered several years for the same families since it is very much to be doubted that a year provides a sufficient period to reveal the complete adjustment of a family to its income when that income fluctuates from year to year.

Obviously the terms "solvency," "insolvency," "failure," "success," and "casualty," are used in a somewhat figurative sense. One should not draw the inference that the consequence of a single year's deficit is bankruptcy or that success follows from a single year's surplus. However, since we are concerned here essentially with the

TABLE 2. ESTIMATED NUMBERS OF SOLVENT AND INSOLVENT FARMS AT PARTICULAR FARM SIZE AND INCOME LEVELS

Farm size	No. of farms[1]	Net farm income	Solvency rate	No. of solvent farms (Col. 4 times Col. 2)	No. of insolvent farms (Col. 2 minus Col. 5)	Net solvent farms (Col. 5 minus Col. 6)
Acres	No.	Dol.	Pct.	No.	No.	No.
40	2,500	875	52.0	1,300	1,200	100
60	1,667	1,101	70.3	1,172	495	677
80	1,250	1,312	80.7	1,009	241	768
100	1,000	1,500	78.3	783	217	566
120	833	1,750	85.0	708	125	583
160	625	2,316	92.0	575	50	525

[1] On the basis of an area of 100,000 acres.

FIG. 2

concept of a standard of living it does follow that where income is less than expenditures there are only two alternatives—a forced decline in the level of living or economic casualty. One final qualification upon the use of these data needs only a mention. The prices used in computing expenditures are those of 1935–36. Subsequent use of these data will require adjustment of prices to the levels suitable to the time of use.

If these refinements were introduced they might dictate a slightly different choice of income objective or farm size. Before any final choice is made for the Columbia Basin the modifications will be made. The present purpose of this analysis, however, is to propose a method—and the method would be essentially unaltered by the considerations above.

NOTES

JOB ANALYSIS OF CHORES ON DAIRY FARMS

IN MAY, 1942, the Vermont Agricultural Experiment Station began a study of labor efficiency in the dairy barn, using methods and procedures that have been developed in industry during the past three decades for the so-called "motion-and-time studies." Briefly, the procedure consisted of an analysis of jobs performed, including a study of the time and motions involved in their performance.[1]

Detailed information concerning the factors that govern the efficiency of labor on individual farm jobs apparently is lacking in the published literature on comparative farm labor efficiency. At the present time, when increased farm production is needed in the national interest, and when a considerable portion of farm help, including members of the farm families, regular employees, and casual laborers, have moved into the army and into industrial employment, farmers all over the country are faced with the necessity of making adjustments in order to get their work done. This study of barn chores on dairy farms was undertaken with the hope of finding ways to save labor in performing specific tasks through changes in routines and barn arrangement and through adjustment and adaptation of equipment. Measurements of time spent and steps taken were used in checking accomplishment.

Chores in dairy barns are performed 730 times each year, and their importance in Vermont is further emphasized by the fact that nearly three-fourths of the farm income of the State is directly traceable to sales of milk products.

In June, 1942, the writer made two or more visits to each of a dozen farms located on a loop road within a few miles of his home. All farms on this road were visited, with the exception of one farm with more than 50 cows, where the activity was too extensive for careful observation by one man. All farmers to whom the experiment was explained agreed to cooperate. The dairies visited varied from 8 to 37 cows in size and included both hand-milked and machine-milked herds.

The observer arrived at the farm before chores were begun in the morning and stayed until they were completed. Evening chores were observed in the same manner. It was found that on these 12

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[1] Job: any definite, complete piece of work, such as milking, feeding the cows, cleaning the cows, or removing manure.

farms there were at least 241 separate operations or combinations of operations performed under the general heading of "chores."[2] No single farm included all 241 operations. Since only 12 farms were observed, the number of operations that enter into chores on dairy farms is doubtless much larger than this figure indicates.

The preliminary observations indicated not only a tremendous variation among farms in the type of work done as "chores," but also an even greater difference among farms in the quality and quantity of work done per cow for specific parts of each operation. One farm operator cleaned the cow stable only at night, before the cows entered. Another kept the cows in the barn only a short time, driving each one out as soon as she had been milked to avoid as much cleaning as possible. Still a third spent about as much time cleaning and bedding his herd as he spent milking. Some farmers used sawdust under their cows, one farmer used straw, several used no bedding, and a few used lime or acid phosphate in the gutter. Variation was found from herd to herd in regard to washing udders, rinsing milking machine teat cups, and the care and handling of ice, cooling equipment, milk pails, strainers, etc.

The writer used a stopwatch, clipboard, pad of $8\frac{1}{2}''$ by $11''$ ruled paper, pencil, chalk, and a 100-foot tape measure. He made a complete record of all activities observed in connection with the chores within the dairy barn or in outbuildings or barnyard. The record included notations of distances traveled, time spent, tools used, location in which the work was done, animals or equipment involved, and any other pertinent information.

After the first few records, some improvement in technique was made. A form sheet was designed to facilitate the process of recording and to eliminate omissions. Attempts at "shorthand" were abandoned. Short, curt phrases were used to describe the operations of a specific job. After the first record had been analyzed, each job was carefully defined and described to prevent overlapping in recording and to permit comparison of records obtained on other farms. A method was developed for dividing the barn into travel areas and for numbering locations.

If cows were machine-milked, it was found that one man could make a satisfactory record of the operations performed by two workers. If cows were hand-milked, the work of as many as three

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[2] Operation: an act performed as part of a job, such as travel to the grain box, picking up grain measure, filling measure, travel to cows with grain, dumping grain in front of cows, or travel back to grain box.

men might be recorded. No attempt was made to record activities in stables where more than three persons were working simultaneously.

In addition to the records of operations involved in the various jobs, diagrams were made of the floor plan of each dairy barn and of the layout of the farmstead; materials and equipment were listed and their locations carefully noted. Enough additional information was secured from each farmer to compute the size of his farm business in terms of man-work units and man equivalent.

When the records obtained on these 12 farms were analyzed, it was found that there were about 20 jobs involved in summer chores, not all of which were necessarily performed on any one farm. It was found that the time and travel involved in performing the chores were not related to the number of operations. Some farmers who performed "extra" operations, such as washing udders before milking, or rinsing teat cups after each cow, were able to do their chores in less time per cow than were some of the farmers who omitted these operations. Time and travel per cow were not directly related to size of herd; some farmers with small herds secured more milk per cow in less time than did farmers with much larger herds. Machine-milking was not always quicker than hand-milking. Farmers who were markedly efficient in some of the chore jobs were extremely inefficient in others.

A careful study of the chores on these 12 farms indicated six ways in which labor efficiency might be increased:

1. Improved care and operation of milking machines.
2. Better planning of work and greater specialization of labor.
3. Better positioning of animals, materials, and equipment.
4. Repair and adjustment of equipment or use of more suitable equipment.
5. Improved barn plan and farmstead layout.
6. Development of standards of performance for jobs and for operations in doing chores.

Because some operators were securing much better results from milking machines than were others, the manufacturers of the milking machines[3] were asked to make suggestions concerning their care and operation. From these replies, a set of rules was drawn up to help farmers use their machines more efficiently.

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[3] Seven makes of machines were observed on the 12 farms.

Routines[4] in the barns varied greatly. Some farmers did their chores in a logical manner, seldom "back-tracking," and with supplies and equipment always at hand when needed. Others interrupted themselves needlessly and traveled about the stable in an aimless manner. An operator might follow an excellent routine for part of his chores, such as feeding grain, and yet show evidence of poor planning for some other job, such as milking. Indifferent milkers were often observed stripping the cows after the milking machine, while more alert workers performed duties that did not require so much skill or intelligence. A well-integrated routine, using to the best advantage each worker's capabilities, is a means of saving time and travel in the barn.

Equipment in many barns was poorly adapted and in bad repair. Many cleaning tools were too small or in poor condition. Often there was no tool to do a job easily. Carts were not often used. Pails, baskets, grain dishes, and other containers in constant use often were discards from the field or the kitchen. Wheelbarrows usually were heavy, poorly balanced, and too small. Stanchions, manure carriers, and door-latches frequently were out of order. Self-closing devices, such as door springs or counterweights, were seldom used. Most home-made equipment was poorly designed and only partially satisfactory. In general, it was felt that farmers should try to roll rather than lift heavy loads; that larger and more suitable tools were needed; and that existing equipment, if properly repaired and adjusted, would perform its functions much quicker and more easily.

Most farmers had tried to lay out their barns in what, to them, were satisfactory patterns. Unfortunately, on many farms the layout facilitated the work of one job but hindered some other job. Barn plans had been worked out with labor-saving operations in mind, but not enough consideration had been given to *all* barn operations. An effective barn layout must take into account all barn operations, and changes should be made only after consideration is given to the *net* effect. In many barns, slight modifications of the existing pattern would be very helpful and relatively inexpensive. An example of a modification of general applicability is the opening of the stanchion line at both ends of the barn to permit circular

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[4] Routine: any regular course of action adhered to through force of habit. A plan followed regularly becomes a routine.

travel;[5] another, the arrangement of the cows in a compact unit as close as possible to the door leading to the milk room.

Animals, materials, and equipment should all be arranged to reduce the amount of labor. The grain box often was located at the far end of the stable. Bedding frequently was stored at some distance from the place of daily use. Empty stanchions, or animals other than milking cows, interfered with consecutive milking. Many other small but important examples of improper arrangement might be mentioned. In many barns, a small change in the location of equipment, supplies, or livestock would save both time and labor.

Finally, there is a lack of standards of performance in doing chores. The fact that no two of the twelve farmers performed identically the same jobs or the same operations in doing a particular job suggests that standards are needed. Adequate standards should indicate the approximate time for performing a given operation; should establish a minimum standard for the quality of the work and of the product; and should suggest methods by which the standards may be attained. Regulations of the health department establish minimum standards of sanitation in the dairy barn. Recent studies provide new knowledge of physiological conditions peculiar to the dairy cow that may help establish standards of performance in caring for cows.[6]

After these six ways of saving labor in dairy barns were derived from the analysis of the jobs and operations performed on the 12 farms, the next step was to test these ways of saving labor on a dairy farm selected at random.

A list was obtained from the county agent of twelve other farmers in the same area. The first farm on the list was inaccessible. This was eliminated, because the writer had to be there before chores were begun in the morning, and transportation was not available. The second farmer was approached and was very curious about both the method and the purpose of the experiment. He admitted that

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[5] Circular travel: making a round-trip about a unit of work, such as a group of cows, without need of retracing steps.

[6] C. W. Turner, Factors Affecting the Composition of Milk. Univ. of Missouri Agr. Exp. Sta., Bul. 365, 1936.

W. E. Petersen, The Cow's Udder. Univ. of Minn. Agr. Exp. Sta., Bul. 361, 1942.

A. C. Dahberg, The Influence on Milk Production of a Definite Time Interval for Milking Cows by Machine. New York State Agr. Exp. Sta. at Geneva, N. Y., Bul. 697, 1941.

he was dissatisfied with the time and effort required to do his chores, but he was frankly skeptical of results to be obtained by applying methods suggested by an outsider. He was willing, however, to try the experiment.

An agreement in writing was made between the Experiment Station and the cooperating farmer. It provided that either was to be free to withdraw from the experiment at any time. It also contained a provision relieving both the Experiment Station and the cooperator of any liability to the other for accidents or for property damage.

The cooperating farmer was 51 years old, weighed 165 pounds, was six feet tall, and was in good health. He had lived on his farm for 34 years. The farm had 33 acres of hay and other crops; a 1,200-tree sugar bush, woods, and pasture occupied the rest of the 150 acres. There were a milking herd of 22 Jerseys, a team of horses, and a few other livestock. In conventional farm-management terms, this was a farm of 457 man-work units, where the operator did most of the work alone. (In the year ended in June, 1942, he employed 37 days of paid labor and had no unpaid labor.) His accomplishment was computed at 415 productive-man-work units.

The first steps taken were identical with those on the 12 sample farms. All operations involved in night and morning chores were carefully observed and recorded. Detailed diagrams were prepared showing the plans of the barn and the layout of the farmstead. All barn equipment was listed and described and its location was noted. Complete records were made of time and travel as they were found at the outset. Locations of material, equipment, and animals were indicated on the diagrams, and the routes traveled in the performance of each job were carefully plotted. In addition, a number of photographs were taken. It was felt to be desirable, in case relations with the cooperator should become strained, that conditions might be restored to those found at the time of the first visit.

During July and August, in the midst of haying and harvesting, this farmer attempted to apply the six methods for saving time and travel. Changes were made slowly and with as little interference as possible with the regular farm work. Chores began at 4 o'clock both morning and evening. *All jobs* and *all operations* that were being performed on June 29, the day of the first visit, were continued. Although some operations were performed differently, none were discontinued. All changes in routines, locations of materials,

care and operation of milking machines, and layout of barn and farmstead, and all modifications of equipment were made after joint discussion of the problems by the cooperator and the writer. Most of these discussions occurred during milking. During the course of the experiment, a number of cows were dried off and others freshened. At the time of the first record and of the last, 22 cows were being milked.

Results

On June 29, 1942, the cooperating farmer traveled more than 16,100 feet doing chores. At the time of the last observation, October 21, 1942, only 5,700 feet were traveled in performing the same operations. The time required daily at the beginning was about 5 hours and 20 minutes. The time on October 21 was 3 hours and 27 minutes. A little more than one-third of the time and about two-thirds of the travel had been eliminated. There was also an appreciable, though unmeasured, reduction in fatigue.[7]

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[7] For a complete account of the study see: R. M. Carter, Labor Saving Through Farm Job Analysis. Univ. of Vermont Agr. Exp. Sta. Bull. 503, 1943.

ARE STATE MARGARINE TAXES CONSTITUTIONALLY VULNERABLE?

IN PEACE time there can be little doubt that the state excise taxes on the sale of margarine are constitutional. During a war, however, the effect of these taxes may burden and obstruct the operation of the war powers of the Congress of the United States. If this sort of conflict clearly occurs, and is shown to the satisfaction of the court, the state taxes may be declared unconstitutional, just as the taxes of Maryland on United States bank notes were invalidated by John Marshall in the famous case of *McCulloch* v. *Maryland*[1] in 1819. The following pages indicate how a conflict of powers might arise, show how the issue could be clearly placed before the federal courts, and discuss the constitutional basis for setting aside the state excise taxes on margarine for the duration of the war.

The writer is fully conscious of the seriousness of the issue. The

[1] 4 Wheat. 316.

federal system is involved. In our form of federalism, two govern-
ments, the state and the national, operate together in the same
territory—yet both governments are legally "sovereign"! How can
there be "an indestructible union of indestructible states"? The
answer that political theory gives to the question is that *neither
government finds its source of power in the other: both governments de-
rive their authority from a third source, the final sovereign, the people
of the United States.*

In practice, our theory of federalism is greatly modified. Federal
power is used to implement state power and vice versa. To a degree,
state governments are acquiring some of the aspects of administra-
tive agencies of the federal government under grant-in-aid legisla-
tion. So much for cooperation, but there is another side to the
relationship. Under the commerce and general welfare clauses, the
federal government has recently moved into areas once thought to
be peculiarly the domain of the states. On the other hand, many
states have enacted laws which are effective barriers to trade. The
margarine taxes are in the latter category.

In so far as the state statutes which are restrictive upon trade
are clearly regulations of interstate commerce, Congress has the
remedy within its grasp.[2] Yet even here, if the state regulation is
in the form of a tax, a different question arises. For the power to
tax, in the words of John Marshall,[3] is

"one of vital importance; . . . it is retained by the states; . . . it is not
abridged by the grant of similar powers to the government of the Union;
. . . it is to be concurrently exercised by the two governments. . . ."

Taxation is a power essential to sovereignty.

Numerous recent decisions of the Supreme Court show the re-
spect for which this element of state authority is held.[4] The result
today is that high confusion characterizes intergovernmental rela-
tionships in the field of taxation. As Professor B. F. Wright puts it,

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[2] State trucking regulations are a familiar example. See the discussion in TNEC
Hearings, Part 29, March, 1940. Congress has power to occupy the field, *South Caro-
lina Highway Department* v. *Barnwell Brothers*, 303 U. S. 177, and, indeed, has dele-
gated authority to regulate these matters to the Interstate Commerce Commission
in the Motor Vehicle Act of 1935; see *Welch* v. *New Hampshire*, 306 U. S. 79.

[3] *McCulloch* v. *Maryland*, op. cit.

[4] *Henneford* v. *Silas Mason Co.*, 300 U. S. 577 (1937), *Western Livestock Co.* v.
Bureau of Revenue, 303 U. S. 250 (1938), *McGoldrick* v. *Berwind White Coal Mining
Co.*, 309 U. S. 33 (1940), *Ford Motor Co.* v. *Beauchamp*, 308 U. S. 331 (1939), and
Nelson v. *Sears Roebuck & Co.*, 312 U. S. 359 (1941). Numerous recent cases limiting
state taxing power could be cited. A borderline case, and one frequently cited as
showing the division within the Court, is *McCarroll* v. *Dixie Greyhound Lines, Inc.*,
309 U. S. 176 (1940). See William B. Lockhart, State Tax Barriers to Interstate
Trade, 53 *Harvard Law Review* 1253.

"The situation in state taxation is now similar to that in railroad regulation just prior to the Wabash decision (1886)." He anticipates the possibility of further taxation decisions which, just as the Wabash Case paved the way for the creation of the Interstate Commerce Commission, may call forth a tax commission. Such a body, operating

"under general principles established by Congress, would have the duty of working out a division of revenue sources among states and between states and nation, perhaps laying its orders before Congress for approval or disapproval. . . ."[5]

Numerous proposals more or less akin to this one have been made.[6]

Thus the margarine taxes are part of a larger, and very perplexing problem which needs to be approached systematically as a unit. One of the encouraging signs of the times is the manner in which men of both parties and both levels of government are taking hold of the problem. But the long-range answers to be worked out require a degree of deliberation that the nation may not be able to afford if the fats and oils situation becomes much more serious. Nevertheless, the general problem remains, and any attack specifically directed at state margarine taxes *should be clearly recognized as an expedient which is limited to the duration of the emergency.*

The leading state margarine tax case is *Magnano* v. *Hamilton*, 292 U. S. 42 (1934), involving a levy of 15 cents per pound on all butter substitutes sold in the state of Washington. The desire of the legislature to protect the home dairy interests was obvious in the record before the court. Yet the tax was sustained; and the opinion (with no dissents) appears definitive. The dairy interests have not hidden their motives in striving for the enactment of such statutes;[7] but such ulterior purposes, whether disclosed or not, make no differences to the court.

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[5] B. F. Wright, The Growth of American Constitutional Law, Houghton, Mifflin, Co., 1942, p. 236.

[6] See that of Frank Bane, Executive Director of the Council of State Governments: that Congress create a committee on Federal-State Relations which would be similar to the Temporary National Economic Committee; it would have representatives of both Houses and the Administration and would cooperate with a committee of the Council of State Governments. TNEC, *Hearings*, Part 29, March, 1940, pp. 15,738 ff.

The recent report of the Committee on Intergovernmental Fiscal Relations of the Treasury Dep't, Washington, D. C., Jan. 1, 1943, recommends the creation of a Federal-State Fiscal Authority, I, pp. 6–9.

[7] See, for example, J. Wilner Sunderson, in Tax Barriers to Trade, a Symposium in Chicago (June, 1940), conducted by the Tax Institute which is integrated with the Wharton School of Finance and Commerce of the University of Pennsylvania. Pp. 92–93.

Magnano had challenged the Washington legislation as a deprivation of property without due process of law and a denial of equal protection of the laws. He further contended that the tax was not levied for a public purpose but with the sole intent of burdening or prohibiting the manufacture or sale of oleomargarine, in order to aid the dairy industry; and he contended that the tax unjustly and unduly burdened interstate commerce and interfered with the right of Congress to "lay and collect taxes . . . " None of these points was granted.

Therefore anyone seeking to attack the state laws must find a new avenue of approach. Turning again to *McCulloch* v. *Maryland*, we read that

"the states have no power, by taxation or otherwise, to retard, impede, burden, or in any manner control, the operations of the constitutional laws enacted by Congress to carry into execution the powers vested in the general government."

This famous principle has had an extraordinary revival in recent years. The McCulloch doctrine was one of judicial relativity; that is, it required the Court to scrutinize state legislation to see whether the effect of the state laws was to burden or impede the operations of constitutional federal power. But a line of cases changed this flexible and realistic approach into an arbitrary restriction imposing a categorical inability on either government (state or national) even to collect income taxes on salaries of officers or agents of the other government.[8]

Lately a trend of decisions has emerged by which the Court has returned to the McCulloch doctrine. The break came in 1939 with the O'Keefe Case.[9] Attention of the Court now focuses upon the constitutionally improper *effects* of state taxes. True, recent cases have permitted the collection of taxes which would have been disallowed under the old and arbitrary doctrine. This fact does not refute the suggestion that the McCulloch doctrine provides a means for setting aside state margarine taxes during the war. State taxes which do burden or obstruct legal federal power may still be declared unconstitutional.

Given certain circumstances, the McCulloch doctrine might therefore be applied to the war powers of the United States in the

[8] *Dobbins* v. *Erie County*, 16 Pet. 435 (1842).
Collector v. *Day*, 11 Wall. 113 (1871).
[9] *Graves* et al. v. *New York* ex rel. *O'Keefe*, 306 U. S. 466 (1939).

matter of the state margarine taxes. The War Food Administration has been given sweeping authority over the distribution of food.[10] Let us suppose that the Administrator issues an executive order directing the manner in which margarine is to be distributed; suppose further that this manner of distribution is impeded or obstructed by state margarine taxes. Is there any reason why they should not be set aside?

It might be argued, however, that the state taxes did not burden or obstruct the activities of an *agency* or an *instrument* of the federal government. But in that case another step could be taken. If the fats and oils situation became sufficiently serious, the Food Administration might elect to requisition the available stocks of margarine in the country and to take over the factories producing margarine.[11,12] The product would be owned by the United States; its distribution would be subject to federal order just as much as troop movements are. Given such a situation, the Supreme Court might then very well set aside state margarine taxes that were shown to burden or impede the distribution of federally owned margarine.

The necessary conditions to such an outcome would be:

(1) that federal acquisition of margarine stocks and factories is shown to be necessary for the effective prosecution of the war and that the improved distribution of margarine resulting from the acquisition is shown to be burdened by the state taxes; and

(2) that Congressional enactments permit the acquisition of stocks of margarine and margarine factories.

Whether the first of these conditions will exist during the war remains to be seen. The fats and oils situation may indeed be critical within a year. Without access to margarine the people in some states will have their eating habits greatly disturbed, and may not obtain enough fat for working efficiency.

As for the second condition, two questions are involved: first,

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[10] Executive Order 9280, December 8, 1942. Power is given over food priorities and allocations, and the administrator is further charged to "Take all appropriate steps to insure the efficient and proper distribution of the available supplies of food."

[11] Again under the authority of Exec. Order 9280, which vests in the War Food Administration the powers already listed in Exec. Orders 9024 and 9040 regarding requisition of food and the acquisition of property—powers finally derived from the Act of Congress of July 2, 1917, as amended by Title II of the Second War Powers Act (1942).

[12] In 1937 there were 16 establishments producing margarine (other than the Meat Packing Industry) Biennial Census of Manufacturer, Department of Commerce, Bureau of the Census, p. 202, Table 1.

What do the statutes say? Second, What is the "intent" of Congress? The Food Administrator is vested with the authority to acquire property. The statutory basis is as follows:

"The Secretary of War . . . or any other officer, board, commission, or governmental corporation authorized by the President, may acquire by purchase, donation, or other means of transfer, or may cause proceedings to be instituted in any court having jurisdiction of such proceedings, to acquire by condemnation, any real property, temporary use thereof, or other interest therein, together with any personal property used thereon or used therewith, that shall be deemed necessary for military, naval, or other war purposes. . . ." Public Law 507, 77th Congress, March, 1942, Title II. (The Second War Powers Act.)

Those who are opposed to the course here suggested will point out that there is a federal tax on margarine which is still on the books.[13] This tax dates from 1902, however; and its continued existence does not detract from the sweeping powers of acquisition already noted. Congress might decide to remove its own tax for the duration; but such action would appear to be an unnecessary use of precious legislative time if an acquisition were carried through, for then the tax would cease to operate.

The opponents could, of course, introduce a bill to prevent or nullify the acquisition. But if they did, would they not be open to the serious charge of trying to protect the dairy industry at the expense of the war effort. Though some Congressmen from the dairy regions may object, Congress as a whole is not likely to do so if events develop in the manner that these pages suggest as possible.

Nor would the Supreme Court find it difficult to set aside the state margarine taxes for the duration.[14] The authority of *McCulloch v. Maryland* is very great. Its frequent citation in recent cases of crucial importance shows that it is living law. If the fats and oils situation becomes much tighter, a way seems open so that John Marshall's ringing decision may be applied once more to the state

[13] The tax is $\frac{1}{4}$ of a cent per pound on oleomargarine or other butter substitutes if free of coloring; the colored product being taxed 10 cents per pound. The tax was upheld in *McCray* v. *U. S.*, 195 U. S. 27 (1904). The Committee on Intergovernmental Fiscal Relations has this to say: "Possibility of Federal action to counteract this situation (state margarine tax laws) is confronted with the fact of a Federal law taxing oleomargarine, designed, one suspects, for other purposes than revenue." Op. cit., II, p. 47.

[14] See Edward S.Corwin, The President: Office and Powers. New York University Press, 1940, pp. 192–193, for conclusions as to the willingness of the Supreme Court to support vigorous use of the war powers in time of conflict.

margarine taxes, if the latter can be shown clearly to "retard, impede, burden, or . . . control the operations of the constitutional laws enacted by Congress to carry into execution the powers vested in the general government."

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A NUTRITIONAL GUIDE TO WARTIME USE OF AGRICULTURAL RESOURCES

WAR requirements for food and fibre have increased the demands on our agricultural plant. At the same time, the labor and equipment needed to keep the plant in full operation have become scarcer. How can our limited resources be used to greater advantage?

Most nations which have meagre resources have made "ends meet" by producing cereals and similar foods that yield large amounts of nutrients relative to input factors. Russia and Germany have been able to alleviate their food supply problem largely by officially encouraging the greater production of vegetable proteins and oils and by the continued high production of such foods as Irish potatoes. On the other hand, agricultural production in the United States has been guided, until recently, chiefly by market demand, prices, and the costs of producing different crops, or their relative profitableness in an uncontrolled market. Yet, profitableness as determined in an uncontrolled market may be a poor measure of what production should be under war conditions. Although watermelons have recently been a profitable crop, they make little contribution to the nutritional needs of the Nation. At the same time, labor, land and transportation facilities are used to produce and market them. Thus, it has been suggested that the production of crops such as watermelons be discouraged in war time so that resources may be shifted to the production of "more essential crops."[1]

Which are the essential and non-essential crops? How can the

[1] See M. R. Cooper, How Many Workers Do We Need? Land Policy Review, Fall 1942, p. 12. Lucille and Paul Williamson, What We Eat. JOURNAL OF FARM ECONOMICS, August, 1942, p. 701. J. H. MacGillivray, G. C. Hanna, and P. A. Minges, Vitamin, Protein, Calcium, Iron and Calorie Yield of Vegetables Per Acre and Per Man Hour. Proceedings, American Society for Horticultural Science, Vol. 41, 1942. William Kling, Vegetable Goals and Problems, Agr. Situation, Jan., 1943, pp. 17–20.

sheep be separated from the goats? The answer to this question is chiefly dependent on two factors: (1) Which and how much of our resources are used in producing a crop? and (2) what is the food value of the crop? By relating these factors to each other, the efficiency of a crop in converting resources to food may be determined. Clearly, those crops which yield large amounts of nutrients relative to the input of labor, land, transportation and other resources may be considered as making the best use of resources and, therefore, as being most essential, other things being equal. Resources would be used to the fullest advantage and food requirements would be most nearly satisfied if these crops were produced. It is important to note, however, that food production must be nutritionally balanced to prevent the dietary deficiencies that are prevalent among people who subsist on only a few foods of high caloric or other value.

Some studies have already provided a basis for separating the essential from the non-essential crops. One study relates the input of land and labor for producing vegetables to nutritional outputs.[2] Table 2 of this article shows the vitamin values of different vegetables relative to their transported weight. Other determinations may be made although many aspects of the problem will still remain unsolved.[3]

A method of making determinations follows. Usable data are available on the nutritive content of most foods,[4] and input factors, particularly for farm labor and land, are available in a number of reports.[5] Given the farm labor input per acre, and the average yield per acre, the gross farm weight of a crop produced per hour of labor may be determined. To secure the *edible* weight per hour, the farm weight should be adjusted for the portion of the crop ordinarily discarded as waste before consumption. The edible weight produced per hour of labor may then be applied to the estab-

[2] MacGillivray, et al., op. cit.

[3] For example, input data and data on the nutritional content of many foods are not complete. Many factors defy accurate measurement.

[4] See for example, Charlotte Chatfield and Georgian Adams, Proximate Composition of American Food Materials, United States Department of Agriculture, Circular 549. Also, M. A. Bridges, and M. R. Mattice, Food and Beverage Analyses, and H. E. Munsell, Vitamins and Their Occurrence in Foods. The Millbank Memorial Fund Quarterly, October 1940, pp. 311–344.

[5] For example, M. R. Cooper, W. C. Holley, H. W. Hawthorne, and R. S. Washburn, Labor Requirements for Crops and Livestock, Bureau of Agricultural Economics, May 1943. The input of land may be measured by the yield per acre. Data on yields may be secured from the crop reports of the United States Department of Agriculture.

TABLE 1. APPROXIMATE OUTPUT OF VITAMIN A, THIAMIN, ASCORBIC ACID, RIBOFLAVIN, IRON AND CALCIUM PER HOUR OF FARM LABOR INPUT FOR CERTAIN FRESH VEGETABLES, AVERAGE FOR THE UNITED STATES

Vitamin A		Thiamin (Vitamin B₁)		Ascorbic acid (Vitamin C)		Riboflavin (Vitamin G)		Iron		Calcium	
Crop[1]	Thousand international units	Crop[1]	Thousand micrograms	Crop[1]	Thousand milligrams	Crop[1]	Thousand micrograms	Crop[1]	Milligrams	Crop[1]	Thousand milligrams
Spinach	2,978.2	Lettuce (green)	16.7	Green peppers	14.9	Lettuce (green)	50.0	Spinach	477	Spinach (cooked)[2]	70.9
Lettuce (green)	889.6	Lettuce (bleached)	10.7	Spinach	8.9	Spinach	44.7	Lettuce (leaf)	391	Celery	14.8
Green peppers	595.7	Spinach	14.3	Cantaloups	4.0	Green peppers	14.3	Sweet potatoes	144	Carrots	10.1
Sweet potatoes	546.6	Sweet potatoes	14.1	Tomatoes (ripe)	3.4	Sweet potatoes	14.1	Carrots	132	Lettuce (head)	9.6
Carrots	461.5	Watermelon	13.9	Sweet potatoes	3.1	Carrots	13.2	Celery	130	Spinach[2]	9.2
Celery (green)	217.4	Sweet corn	13.7	Lettuce (green)	2.7	Snap beans	10.3	Lettuce (head)	125	Carrots (cooked)	7.3
Tomatoes (ripe)	155.7	Carrots	13.2	Lettuce (bleached)	2.7	Lettuce (bleached)	10.0	Sweet potatoes	97	Lettuce (leaf)	6.0
Snap beans	85.8	Tomatoes (ripe)	11.7	Watermelon	1.9	Tomatoes (ripe)	9.3	Carrots (cooked)	88	Snap beans	4.3
Sweet corn (yellow)	50.9	Cantaloups	8.1	Eggplant	1.6	Cantaloups	8.1	Snap beans	82	Sweet potatoes (boiled)	3.3
Cantaloups	40.3	Eggplant	7.1	Spinach (cooked)	1.4	Watermelon	7.0	Tomatoes	69	Sweet potatoes	3.0
Lettuce (bleached)	22.2	Celery (green)	6.5	Snap beans	1.3	Celery (green)	6.5	Cantaloups	69	Cantaloups	2.3
Eggplant	5.5	Celery (bleached)	6.5	Cucumbers	1.2	Sweet corn	6.1	Watermelon	53	Cucumbers	1.9
Sweet corn (white)	0–5.1	Snap beans	6.4	Carrots	1.1	Eggplant	4.7	Sweet corn	52	Watermelon	1.7
Cucumbers	2.4	Cucumbers	5.3	Celery (green)	1.1	Cucumbers	2.8	Green peppers	49	Tomatoes	1.0
Celery, bleached	2.2	Green peppers	3.6	Celery (bleached)	1.1			Cucumbers	41	Green peppers	1.0
Watermelon	Trace			Sweet corn	1.0					Sweet corn	1.0
				Carrots (cooked)	1.0						
				Sweet corn (cooked)	1.0						
				Snap beans (cooked)	.2						

[1] The output of the raw vegetable is given unless otherwise specified. Values of the cooked vegetable would probably be lower in most cases, especially for ascorbic acid and thiamin.

[2] It has been established that the calcium content of spinach is not utilized by the body.

lished content of vitamins and other nutrients of a given weight of
edible food and the output of nutrients per hour of farm labor input
may be secured. Comparisons can then be made between foods to
determine their relative efficiency in the use of labor. A similar
procedure may be used in determining the nutritive output of dif-
ferent crops and livestock relative to the input of other factors
such as feed, land, and transportation.

For illustration, Table 1 lists a number of fresh vegetables giving
their output of certain nutrients per hour of farm labor input for
the United States as a whole.[6] Thus, the output of vitamins per
hour of farm labor used in the production of spinach is shown to
be as follows: vitamin A, 2,978.2 thousand international units;
thiamin 14.3 thousand micrograms; ascorbic acid 8.9 thousand
milligrams and so forth. After comparing these outputs for spinach
with the outputs of other crops, it may be concluded that spinach
returns relatively great nutritional yields per hour of farm labor
input. This is also true of leaf or green lettuce, sweet potatoes, car-
rots and green peppers. Watermelons, bleached celery, cucumbers,
and eggplant yield relatively small returns.[7] Within the limitations
that will be described later, production of the former group of
crops should be encouraged and the latter group discouraged if
farm labor is to be used to the best advantage. Data such as de-
veloped for the United States in Table 1 may be developed for
different areas and can be used to determine certain shifts of pro-

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[6] Limited space prevents a complete listing of nutrients or of a regional break-
down of data.

[7] Various attempts have been made to secure a ranking of crops that will in-
corporate in it the combined efficiency of a crop in producing all nutrients. One
method of approaching this problm has been to rank the relative efficiency of a
crop in producing each nutrient and then adding these ranks to secure an "efficiency
rating" (see MacGillivray, et al., op. cit.). Another method has been to determine
the contribution of each nutrient that a crop makes, per hour of labor input, to the
daily nutritional needs of an average person as determined by the National Re-
search Council. These contributions are then ranked for each nutrient and added
to secure an efficiency rating.

The methods outlined above are crude in that they give each nutrient equal
weight, although nutrients are not equally important. Moreover, according to the
first method noted above, a difference of one rank for Vitamin A in Table 1 (be-
tween green peppers and sweet potatoes) is 49.1 thousand international units; on
the other hand a one rank difference between carrots and green celery is about five
times as great—244.1 thousand international units. In practice, many crops can be
recognized by inspection as outstanding in their superiority or inferiority although
many will be in a "twilight zone." For making decisions, until an adequate system
of combined ranking is developed, it appears to the author that inspection is a satis-
factory method. For those crops which are difficult to evaluate by inspection, ap-
parently the balance of efficiency or inefficiency is nearly even. These crops may be
considered as not requiring much change of production. The obviously inefficient
or efficient crops could bear the brunt of change.

duction within and between areas which would maximize the production of food nutrients.

In a consideration of alternatives in food production, emphasis should be placed on those foods containing nutrients that are relatively scarce and most needed in the diet. Thus, niacin, ascorbic acid, riboflavin and calcium may be considered as the critical nutrients of 1943 and 1944. Of the vegetables shown in Table 1, green peppers, green or leaf lettuce and spinach appear to be the most efficient producers of these nutrients on the whole; whereas cucumbers, sweet corn, and eggplant appear to be the least efficient producers.

Although certain shifts to the production of more efficient labor-utilizing crops may be suggested by Table 1, such a table should not be the sole guide in making such shifts. Other considerations include:

(1) Are the physical factors of production on any given farm or in any given area adapted to the greater production of a given crop? Land is not always interchangeable in crop production, nor can the skills of the operator or his machinery be applied to the production of all crops. Specialized skills and equipment on many farms could not be converted to different types of production. On most farms, however, there exists a fair degree of elasticity for producing several alternative crops.

(2) In what season do the different crops use labor? Perhaps labor needs are high for a crop but the alternative uses for labor are low in the season of its production. Labor requirements for producing maple sugar may be considered high but to what more efficient use can this labor be applied in the season of maple sugar production?

(3) Do the averages used in Table 1 reflect conditions for all farms? Input-output values vary considerably between farms, each farm having its own yield per acre and labor input. Table 1 only represents average conditions for all farms.

(4) Similar to (1) and (3), labor inputs and yields for the same crop vary for different increments of production on the same farm. Beyond a point in crop production on a farm, marginal yields fall and/or marginal physical inputs rise. Thus, each segment of production will have its own input-output ratio of production factors and nutrients.

(5) How will a change of crops affect the income of farmers? For example, by shifting from a non-essential but intensive crop like

celery to an essential but extensive crop such as cabbage, a farmer may be unable to earn sufficient income from his limited land and other resources.

(6) The incompleteness of available information should be recognized. Although the nutritive value of the same vegetable may vary between areas, between different lots, and between different ways of consumption, there are little data available to make such distinctions.

(7) The physiological aspects of food consumption should be considered. For example, spinach is rated as high in calcium according to laboratory analysis. However, calcium in spinach is not made available to the body on consumption. Similarly, proteins must be differentiated according to type to account for the different kinds needed for adequate nutrition. The physiological limit of intake for different foods is also a conditioning factor. Although a crop may be very efficient in its conversion of resources to food, the limits of human consumption of this food will determine the feasible limits of its production.

(8) What are the fertilizer, transportation, and other requirements of the different crops? Table 2 shows, for example, the content of edible vitamins per 100 grams of gross shipping weight of vegetables. This gross weight includes the portion of the vegetable which is ordinarily not consumed but which is usually transported, such as green pea pods. Thus, a vegetable that has much waste and little nutritive value, like watermelons, is assumed to yield a low return relative to the input of transportation. Distance of haul and special requirements for shipment, like refrigeration, are important considerations which are not accounted for in the table. Otherwise, kale, spinach, watercress, broccoli, green cabbages, and green asparagus appear to make the most efficient use of transportation compared with cucumbers, bleached celery, radishes, watermelons, eggplant and beet root.

Within the limitations noted above, and the psychological problems that are involved in altering diets, information such as shown in Tables 1 and 2 is of value in providing a basis for maximizing food production in a period when resources need to be conserved. It provides an objective basis for production directives and priority actions. How may such information be applied to the operations of the individual farm?

TABLE 2. APPROXIMATE CONTENT OF EDIBLE VITAMIN A, THIAMIN, ASCORBIC ACID AND RIBOFLAVIN, PER 100 GRAMS OF FRESH VEGETABLES (shipped weight)[1]

Vitamin A Content by groups of crops International units	Thiamin (Vitamin B₁) Content by groups of crops Micrograms	Ascorbic acid (Vitamin C) Content by groups of crops Milligrams	Riboflavin (Vitamin G) Content by groups of crops Micrograms
5,001 and over Chard, escarole, kale, spinach	201-300 Green peas	101-150 Peppers (green), peppers (red)	301-400 Kale, spinach
2,001-5,000 Broccoli, lettuce (green), peppers (green), peppers (red), sweet potatoes, squash (winter), water cress	101-200 Asparagus (green), lima beans, okra, Irish potatoes (fresh), water cress	76-100 Kale	201-300 Water cress
1,001-2,000 Cabbage (Chinese), carrots	76-100 Artichokes (globe), sweet corn (white, and yellow without husk), kale, mushrooms, sweet potatoes, spinach	51-75 Spinach, water cress	101-200 Lima beans, snap beans, broccoli, lettuce (green), peppers (green)
501-1,000 Asparagus (green), snap beans, celery (green), squash (summer), tomatoes (fresh, red)	51-75 Snap beans, broccoli, cabbage (Chinese), cabbage (green), cabbage (mature), carrots (without tops), cauliflower, sweet corn (white and yellow with husk), endive, lettuce (green and bleached) tomatoes (fresh, red)	41-50 Cabbage (green), cabbage (mature), cabbage (red), strawberries	76-100 Asparagus (green), chard, onions (mature), green peas, sweet potatoes
201-500 Sweet corn (yellow, without husk), okra, green peas	26-50 Beet root (without tops), cantaloups, carrots (with tops), cucumbers, eggplant, escarole, onions (mature), radishes, squash (summer), squash (winter) turnip root (white and yellow without tops), watermelon	31-40 Broccoli, cabbage (Chinese) cauliflower, chard	51-75 Cabbage (green), carrots (without tops), endive, escarole, squash (winter), tomatoes
101-200 Lima beans, cantaloups, sweet corn (yellow, with husk)	1-25 Beet root (with top), celery (bleached), celery (green), peppers (green), peppers (red), turnip root (white and yellow with tops)	21-30 Asparagus, tomatoes (red, fresh), turnip root (yellow and white, without tops)	26-50 Cabbage (Chinese), cabbage (mature, cantaloups, carrots (with tops), cauliflower, sweet corn (yellow, without husk), eggplant, Irish potatoes (fresh), squash (summer), turnip root (white and yellow, without tops), lettuce (bleached)
1-100 Artichokes (globe), cabbage (green), cauliflower, celery (bleached), sweet corn (white), cucumbers, eggplant, Irish potatoes, (fresh), turnip root, (yellow), lettuce (bleached)		11-20 Lima beans, snap beans, cabbage (green, cooked 30 minutes), cantaloups, cauliflower (cooked), honey ball melon, okra, green peas, sweet potatoes, turnip root (white and yellow, with tops)	1-25 Beet root, celery, sweet corn (yellow with husk), cucumbers, radishes, turnip root (yellow and white, with tops), watermelon
0 Beet root, cabbage (bleached), mushrooms, turnip root (white)		1-10 Artichokes (globe), snap beans (cooked), beet root, broccoli (cooked), carrots (cooked and raw), celery (bleached), celery (green), sweet corn (yellow and white, cooked), cucumbers, eggplant, escarole, lettuce (green), honey dew melons, onions (green), onions (mature), green peas (cooked), Irish potatoes (fresh), radishes, spinach (cooked), squash (winter), watermelon	
Trace Radishes, strawberries, watermelon			

[1] The content of the raw vegetable is given unless otherwise specified.
Computed from M. A. Bridges, and M. R. Mattice, Food and Beverage Analyses and Charlotte Chatfield, and Georgian Adams—Proximate Composition of American Food Materials, United States Department of Agriculture, Circular 549.

Application to Individual Farms

Suggested shifts toward the production of vegetable crops which produce more nutrients per hour of farm labor input and which make efficient use of transportation facilities were budgeted for a truck crop farm in Maryland and for one in Massachusetts. What were the production results and the effect on labor needs and farm income?

The farm in Maryland is located in Wicomico County.[8] It is a small unit of 33 acres which receives 88 percent of its cash income from the sale of cantaloups, cucumbers, sweet potatoes, and watermelons. It is estimated that approximately 1,390 man hours of labor are applied to these crops.

The present crop plan was altered to make the farm produce crops of greater nutritive value relative to labor and transportation input. Total cultivated acreage remained the same but the acreage of cucumbers was halved and watermelons were no longer grown; cantaloup and sweet potato acreage was increased. Under the new organization, it is estimated that labor needs were substantially unchanged, the seasonal distribution of labor needs also remaining about the same. Gross farm income increased slightly under the reorganization, and net farm income increased considerably. At the same time, the food value of the crops produced increased, the output of ascorbic acid increasing 30 percent and the output of riboflavin increasing 8 percent.

Somewhat different results were obtained when a truck crop farm in Bristol County, Massachusetts[9] was reorganized. This farm is a small market garden enterprise of 17 acres. Practically all cash farm income is derived from the sale of fresh green beans, wax beans, carrots, celery, sweet corn, cucumbers, eggplant, Iceberg lettuce, green peppers, spinach, and tomatoes. Under the existing crop plan, approximately 2,429 man hours of labor are expended.

In the reorganization, wax beans, celery, and eggplant were no longer grown and the acreage of cucumbers was reduced. Lettuce, spinach, and tomato acreages were increased. About 10 percent less total labor was required than formerly. In the months of peak

[8] Farm A, from Lawrence E. Cron, Planning Adjustments on Truck Crop Farms in Wicomico County, Maryland, processed, Bureau of Agricultural Economics in cooperation with the Maryland Agricultural Experiment Station, June, 1941.
[9] Farm A, from N. R. Urquhart and C. R. Creek, Farm Management Problems and Suggested Adjustments on Vegetable Farms in Bristol County, Massachusetts, processed, June, 1941, Bureau of Agricultural Economics in cooperation with the Massachusetts Agricultural Experiment Station.

labor requirements, slightly less labor was needed. Unlike the reorganization of the Wicomico County farm, indicated adjustments proved to be unprofitable for the farm. Gross and net income decreased. However, the food value of the crops increased.

Farm income in any year is dependent on the prices received for the crops grown and costs of production. The farms described above were analyzed with price and cost conditions of 1939. In 1943 and 1944 different prices and costs will be in effect and different results would be obtained from a reorganization. To encourage the production of crops which yield most nutrients per unit of input, price policy should allow for relatively high prices for these crops so that shifts will be profitable. Government purchase and price support programs and the fixing of price ceilings should recognize this principle.

In summary, the application of nutritional science to the economics of food production provides a means for determining the most efficient ways of producing food. Information on the nutritional output relative to input factors for different crops and livestock is helpful in gearing the Nation's agriculture to war. Priority actions and production directives are facilitated. Such information provides the basis for a war production policy which husbands resources and yet provides for adequate food supplies.

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FARM LABOR POLICY, 1942-1943*

NOT since the first World War has agricultural labor received such widespread attention as it has since Pearl Harbor. Passage of the Farm Labor Act of 1943 last Spring marked the first time in the recent history of this country that a law dealing with farm labor alone had been enacted, and underlined the general concern with the adequacy of the farm labor supply for agriculture's war tasks. The position of farmers and farm workers with respect to the draft and the movement of farm wages have both been affected by Congressional and administrative action in the recent past. In short, the last year and a half has seen the slow development of a national policy dealing with the supply and compensation of farm labor.

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* The opinions expressed in this essay are solely those of the author, and do not reflect the ideas of any group with which he is or may have been associated.

The factors bringing about stringency of farm labor are well known: the draft, high industrial wages, and the generally inferior economic position of the farm worker all have acted to take several million persons out of the farm labor force since the beginning of the defense program in mid-1940. Between September 1941 and September 1942, alone, about 1,600,000 farm workers and operators entered the armed forces or industrial employment, about 900,000 going into the latter field and about 700,000 donning uniform.[1]

Rising farm wages have clearly reflected the decrease in the farm labor force. Between April 1, 1940 and April 1, 1943, daily farm wages without board rose over 80 per cent.[2] Only by such a sharp rise in wages—and a similar though less steep increase in farm prices and incomes—did agriculture succeed in retaining about the same average employment in 1942 as it had in 1941. During the first half of this year, farm employment hovered but slightly below the corresponding figures of 1942 and 1941.[3]

Until the late Summer of 1942, little extraordinary governmental attention was paid farm labor. The existing agencies previously active in this field—chiefly the U. S. Employment Service's Farm Placement Section, and the Farm Security Administration's farm labor camp group—tried to extend their work as best they could in order to mobilize additional farm workers, but they had little in the way of additional appropriations or personnel to aid them. Volunteer organizations—composed mainly of city women and older students—mobilized several thousand workers not usually engaged in agriculture. Several thousand Japanese-Americans evacuated from the Pacific Coast to Relocation Centers in the central United States volunteered for farm work and were very helpful, particularly in the Mountain State sugar beet districts. To a greater extent than usual, schools in many areas closed down for several weeks at a time so students could help harvest nearby crops.

To understand this lack of vigorous government intervention, it must be remembered that for more than a decade before 1942, agriculture had been plagued by a surplus labor force backed up on the farms by the lack of industrial job opportunities. For the first year or more of the defense program, the exodus of farm

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[1] U. S. Dept. of Agriculture, The agricultural manpower situation, Nov. 1942.
[2] Bureau of Agricultural Economics, Farm Labor Report, April 1943 and October 1942.
[3] Ibid., January–June 1943.

workers was socially desirable since it made available to other essential activities persons whom agriculture could easily replace by more fully utilizing its remaining labor resources. The wage rises that accompanied this exodus merely reflected the disappearance of the surplus, and helped farm workers keep up with the rise in the cost of living and in non-farm wages.

By the late summer of 1942, however, it had become apparent that in a number of vital farm areas, labor difficulties threatened to interfere with farm production. Serious shortages had begun to appear both of skilled hands hired by the month, and of seasonal workers—frequently migrants coming long distances—hired by the day or piece for peak periods of labor need. From this point on, new types of government intervention in the field of farm labor appeared.

Farm Worker Transportation and Training

Financed by a special grant from the President's emergency funds, the Farm Security Administration, in cooperation with the U. S. Employment Service, undertook a three-fold program in September 1942. First it proposed to provide free transportation for farm workers from areas of underemployment and unemployment to areas facing shortages of farm workers, thus enabling counties still having a surplus to provide seasonal workers for less fortunate districts. Second, it proposed to take farm workers and small farmers from areas of poor soil and surplus farm population, give them training in the utilization of farm machinery and in the handling of livestock, and move them to areas where they could receive work as year-round hands on productive dairy and other farms. Third, Farm Security Administration proposed to import several thousand Mexican laborers from our neighbor to the South for work in Western and Southwestern states which had customarily been done by workers of Mexican or Spanish-American extraction.

Until the passage of the Farm Labor Act of 1943, this program required payment of prevailing wages to all workers transported by it, provision of housing meeting certain minimum standards, and employment for at least 75 percent of the working days during which transported workers were in a given area. To determine prevailing wages, State Farm Wage Boards were set up in over 20 states. These held public hearings and submitted their findings for

approval by the Secretary of Agriculture. For a time, a minimum wage of 30¢ an hour was required of farmers wishing to hire these workers.

Most of the American workers, moved at government expense under this program, came from Missouri, Mississippi, Arkansas, and other Southern states having relative farm labor surpluses and low agricultural incomes and wages, though some were recruited in Chicago and other cities. Florida, Arizona, California, New York, Washington, Idaho, New Jersey, Connecticut, Michigan, Colorado, Montana, and Texas are among the states which have received these workers. Mexican Nationals were first brought into Arizona and California beginning in September 1942, but last Spring several thousand were moved into Washington, Colorado, Wyoming, Montana, Nebraska, and other Western states for sugar beet and other farm work. Recruitment and transportation of workers from the Bahama Islands and Jamaica was begun last Spring and through May these workers had been used in Florida, New Jersey, Connecticut, and other Atlantic Coast states, while some were being moved in the Pacific Northwest. By the end of June, over 50,000 American and foreign farm workers had been moved to labor shortage areas by the Farm Security Administration. About 5,000 of these were men from Kentucky and other Southern states who had received some training to fit them for skilled farm jobs.[4]

The Farm Labor Act of 1943

The integrated farm labor mobilization program operating today had its origin last January 23 when War Manpower Commissioner McNutt placed exclusive direction of all efforts to recruit, transport, and train farm workers in the hands of the Secretary of Agriculture.[5] Up to that time primary responsibility for farm labor had resided with Mr. McNutt, and the Department of Agriculture's activity referred to above had been done under War Manpower Commission authority, with the United States Employment Service playing an important role as a recruiting and placement adjunct of the transportation program. From the time this responsibility was given the Department until passage of the Farm Labor Act of 1943 late in April, the farm labor program was in a state of

[4] The information given here on the Farm Security Administration farm labor activity was obtained from that organization.
[5] War Manpower Commission Press Release, January 23, 1943.

flux—and frequent confusion—since no legislative authority or appropriation existed for a comprehensive effort to mobilize farm workers.[6]

The Farm Labor Act of 1943 appropriated $26,100,000 for agricultural labor mobilization by the War Food Administration in cooperation with the state Extension Services. Recruitment, transportation, training, housing, and placement of workers within each state is the responsibility of that state's Extension Service, while interstate and international recruitment and transportation is a federal function. Existing housing facilities may be repaired or altered by either state or federal agencies to provide quarters for farm workers. None of the money appropriated may be used to move an agricultural worker from a county without the consent of the county agent, if the worker has lived in the county for one year and has been engaged in agricultural labor as his principal occupation.

In accordance with this program, most county agents have hired farm labor assistants to handle this work in their county. State Extension Labor Directors are coordinatng this activity and seeking to facilitate movement of workers between areas in each state. As this is written in early June, the Farm Security Administration is operating the interstate and international recruitment and transportation phases of the program, as well as continuing its farm labor supply centers which have been in operation for several years. Farm Security Administration is responsible also for assuring that our contractual obligations with Mexico, Jamaica, and the Bahama Islands regarding minimum wages, housing, and employment are observed. Overall supervision of the program is in the hands of Col. J. L. Taylor, Deputy Food Administrator.[7]

Women and children appear to be the chief supplementary labor sources which this program contemplates tapping to meet seasonal peak needs. The U. S. Crop Corps will include a Women's Land Army of 50,000 or more persons, and a junior group, the Victory Farm Volunteers, comprised of 500,000 non-farm youth.[8]

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[6] It may be noted that the Federal government's apparent lack of policy or future plans during this period forced a number of states to initiate their own farm labor programs. The California state legislature appropriated $1,500,000 for a state farm labor and farm machinery program. Connecticut's legislature provided $50,000 for farm labor work in that state. New York appointed a farm labor coordinator to bring order out of the chaos that reigned among the different agencies involved.

[7] This paragraph is based on information from the War Food Administration.

[8] Department of Agriculture Press Release, April 30, 1943.

Farm Labor and the Draft

Until the passage of the Tydings Amendment to the Selective Service Act last November, farm workers' deferment had been largely at the discretion of local draft boards guided by some general policy directives from the national headquarters of the Selective Service System as to areas and crops having the greatest farm labor difficulties. In many areas large numbers of farmers and farm workers had been inducted, frequently because the great bulk of eligible men in these areas were engaged in agriculture. The Tydings Amendment requires the deferment of every registrant regularly engaged in an agricultural occupation essential to the war effort so long as he remains so engaged and until such time as a satisfactory replacement can be found. Any man so deferred may be reclassified as available for immediate military service if he leaves farm work without a determination by his local board that it is in the best interests of the war effort for him to do so.[9]

Initially, Selective Service's standard for agricultural deferment was the requirement that a worker tend 16 or more war units, these units being defined in terms of acres of particular crops or number of livestock. Last January, this was modified so that local boards may defer registrants taking care of as little as 8 war units.[10]

Last April a further step was taken to utilize the draft mechanism as a means of obtaining farm workers. County War Boards were empowered to obtain lists of men with dairy farm work experience who are in class IV-F, in non-deferrable industries and between the ages of 38 and 45, or who are over 45. Each War Board may write these men asking them to contact it in order to obtain dairy farm jobs. If men in the first two classes refuse to accept dairy employment, their names may be referred to their local Selective Service Boards for waiver of age or physical disability and consequent induction.[11]

As of April 15, 1943, agricultural deferments numbered over one million men, while by the end of 1943 Selective Service expects to have three million farmers and farm workers deferred on occupational grounds.[12]

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[9] New York Times, Nov. 11, 1943.

[10] Selective Service System, Local Board Release No. 164, Effective: January 16, 1943.

[11] Selective Service System, Local Board Memorandum No. 164-C, Issued April 1, 1943.

[12] Department of Agriculture Press Release, April 30, 1943.

Farm Wage Policy

Farm wages have received special treatment in the anti-inflation program administered by the Office of Economic Stabilization. In December 1942, Economic Stabilization Director Byrnes ruled that the general wage "freeze" would not apply to farm workers earning less than $2,400 annually, and that the wages of such farm workers are the province of the Secretary of Agriculture. This has meant that the great majority of hired farm employees could receive higher wages without securing specific permission from the War Labor Board. This exception was made on the ground that farm wages were substandard, out of line with industrial wages, and inadequate to attract workers to agriculture unless permitted to rise. Up to the time of this writing only one ceiling has been placed on farm wages by the Department of Agriculture. This action was taken on wages paid asparagus harvesters in Northern California.[13]

The continued freedom of agricultural employers to raise wages while cannery and other processing plant operators could not do so without War Labor Board permission threatened for a time last Spring to create great difficulty since farm wages were going above processing wages. To alleviate this condition, Mr. Brynes' directive of last May permits raises for processing workers so as to maintain normal farm-cannery differentials, but such differentials may not exceed eight cents an hour.[14]

From a wage standpoint, agriculture received further protection with the issuance last April of the War Manpower Commission's ban on job changes in essential industries, if such changes are motivated by higher wages alone. Since farm wages are generally below industrial compensation, this provides a legal deterrent to workers who might otherwise leave farm for factory.[15]

Before concluding this survey of farm labor policy it should be noted that our armed forces may—directly and indirectly—furnish large numbers of farm workers. Early in 1943 President Roosevelt announced that in emergencies troops might be used to harvest essential crops. Army regulations permitting commanding officers to issue such authorizations have already been issued.[16] At one time last February Army troops were ordered to pick long staple cotton

[13] Department of Agriculture Press Release April 12, 1943.
[14] Office of War Information Press Release, May 11, 1943.
[15] War Manpower Commission Press Release, April 18, 1943.
[16] War Department Circular No. 90, Section IV, Washington, April 1, 1943.

in Arizona, but this order was rescinded shortly afterward. Prisoners of war captured by our armed forces have already been used to chop cotton in Texas, and Secretary Stimson has announced the general policy of making them available for such work where local supplies of labor are inadequate.[17]

Some Critical Comments

To evaluate properly so complex a program would take far more space than is here available, but some major points may be indicated:

1. Failure to set up a definite farm labor program at an early date—rather than at the end of April—resulted in a good deal of confusion, wasted motion, and farmer discouragement and bewilderment. Confusion in the field was largely the result of confusion and animosities in Washington. Passage of a farm labor appropriation was requested in early February by President Roosevelt, but did not become a reality until three months later—in large part because of Congressional bickering inspired by efforts to "freeze" the Farm Security Administration out of the farm labor picture.[18] The rapid succession of Lyle Watts, John O. Walker, Wayne H. Darrow, and Jay L. Taylor as head of the farm labor program was symptomatic of the uncertainty and confusion in Washington, and this communicated itself to the field.

2. Placing the burden of local mobilization, placement, transportation, and housing of farm workers on the local county and state organizations of the Extension Service represents a gamble by Congress since most Extension personnel has had little contact or experience with farm labor work. At the beginning of May, Extension Directors found themselves starting from scratch to build up a farm labor organization with competent personnel difficult to obtain, and farmers in many areas clamoring for immediate aid. It is difficult to understand the almost casual manner in which the years of experience and activity of the Farm Placement Section of the U. S. Employment Service were dispensed with in the current farm labor program. Some states have hired United States Employment Service farm placement people to do the same work under Extension, but by and large relatively little use has been made of

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[17] New York Times, June 14, 1943, and Washington Star, May 20, 1943.
[18] Reading of the House and Senate Appropriations Committees' Hearings and the Congressional debates on the farm labor bill will furnish abundant evidence of the truth of this contention.

an organization which in 1942 made over 3,000,000 farm placements, and which in many areas did an excellent job in helping farmers.

3. Most discouraging in the present program are the bars set up against full utilization of the American farm labor force. Requiring county agent consent to government transportation of farm workers is—in many areas—tantamount to prohibiting movement even of idle farm workers. Local pressures in the chief areas of farm worker unemployment and underemployment are such as to make it most unlikely that county agents will permit these sources to be tapped for the benefit of other areas. Prohibiting enforcement of any minima in wages or housing for domestic farm workers—although permitting this for foreigners brought in by agreement with their governments—represents a rather amazing discrimination against Americans by Congress. More important, it will hinder recruitment of domestic farm workers for movement to labor shortage areas.

4. The Farm Labor Act's failure to appropriate funds for building additional farm labor camps, as requested by the President, is regrettable. Lack of adequate housing has been a serious bar to recruiting additional workers in many states, and this year more than ever—with thousands of city women and children required—this lack may seriously handicap the farm labor program. Inadequate housing has already caused trouble and dissatisfaction among imported workers in New Jersey and Michigan.[18a]

5. It seems questionable whether it is really in agriculture's interest to become known as the haven of the "draft dodger." If 3,000,000 farm workers are deferred at the end of this year while in non-farm areas fathers with children and with jobs in war work are being drafted, the reaction will not be too favorable to agriculture. Already reports have been printed of workers leaving war jobs in industry in order to obtain deferment on farms. Because of the highly seasonal nature of farm work, moreover, many of those deferred on farms are certain to be seriously underemployed for at least several months during the year, yet the present arrangement gives such workers no incentive to engage in other war work when farm duties are slack.

6. Our farm wage policy has been ambiguous and lacking in concrete objectives. The $2,400 maximum stipulated in Mr. Byrnes'

[18a] See PM, July 7 and 8, 1943, for further details.

order is a poor guidepost since most farm workers are paid by the piece or the day for much of the year and keep poor records of their earnings, thus complicating decisions as to who is or is not covered by the exemption. No objective has been set as to the point at which it is desirable to stabilize farm wages, and difficulties have already risen because of the relationship between cannery and farm wages. Further difficulties will occur unless fundamental decisions are made as to the desirable level of farm wages in relation to industrial wages and action taken to secure and maintain that relationship. England, it should be noted, has approached this problem by setting farm wage minima at points substantially nearer industrial wage rates than had been customary before the war.[19]

7. Our farm labor program has been formulated and administered thus far with an almost complete absence of farm worker participation in deliberations preceding decisions. Not only is this undemocratic, but it is in sharp contrast to all other governmental labor considerations, where labor, management, and the public are represented on decision making bodies. The absence of farm workers' unions of any strength makes it difficult for the government to take counsel with farm workers, yet some technique must be worked out so their ideas are considered in advance of decisions. The difficulties encountered in administering the California asparagus wage ceiling indicate clearly that farm laborers will balk at obeying dictates from Washington or elsewhere, if they have no representation in the framing of these dictates and no advance knowledge of their consideration. There will be more difficulty of this sort unless techniques can be worked out to make farm labor policy making a more democratic process than it now is. The County Farm Wage Boards set up last June are an extreme example of this. Composed entirely of farmers and headed by the county agent, they virtually fix wages for transported farm workers, although farm workers are unrepresented on them.

To sum up: Important strides toward an integrated national farm labor policy have been taken in the past year. The organization now set up will probably get us through this crop season— aided in part by reduced yields caused by weather difficulties. Nevertheless, as the manpower situation becomes tighter it will become increasingly evident that we must obtain a nearer approach to full utilization of all our farm labor force, regardless of crop or

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[19] Information from the British Library of Information.

area. When changes are made which will permit this, and which will introduce more democracy and clearer objectives into the program, we will finally have a farm labor policy of the type needed for total warfare.

<div align="right">Harry Schwartz</div>

Columbia University

COMMENTS ON REGIONAL DEPENDENCY

IN A country the size of the United States, because of specialization due to differences in resources and production, there obviously is much inter-regional trade. The more specialized the economies of areas become, the greater will be the amount of this trade between regions. This in turn makes for more efficient production, higher standards of living, better resource allocation, etc. This is an easily established and commonly accepted economic fact.

That inter-regional trade makes for inter-regional dependency is not, unfortunately, as readily accepted. Slogans of "Patronize Home Industry," "Spend Your Money with Locally Owned Enterprise," as well as many so-called trade barriers and State sumptuary laws attest to this fact. The economy of a region which is highly specialized is almost wholly dependent upon the desire and ability of people outside its borders to buy its products. The money which these "Outsiders" spend in or send into the area—the flow of funds coming into the area—determines in a large part the height of its economic activity and, as a consequence, its income level.

The Ninth Federal Reserve District (Montana, North Dakota, South Dakota, Minnesota, and parts of Wisconsin and Michigan) is predominantly agricultural. A large part of its income comes either directly or indirectly from the sale of farm products. Even much of its manufacturing consists of the processing of agricultural commodities—meat packing, milling, etc. Such a high degree of specialization makes for a correspondingly high degree of dependence upon other areas. This fact is brought out sharply in the accompanying chart. On it are compared "Northwest Farm Income," funds flowing into the area from other Federal Reserve Districts, and "Terms of Trade."[1]

Farm Income is the customary farm receipts series and not in-

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[1] See "Indexes of Terms of Trade Between Areas in the United States," Warren C. Waite: *Review of Economic Statistics*, February, 1942. This series is based upon 1926=100. In the comparison the base has been shifted to 1935–39=100.

come in the true economic sense of the word. This series is currently compiled by the Federal Reserve Bank of Minneapolis.

The inflow of funds represents money payments into the area from other areas and which go through the Ninth Federal Reserve Bank. These annual totals, in millions of dollars, are made up chiefly of payments arising out of commercial transactions. Funds flowing in because of capital movements, open market operations, redemption of Government bonds, and other "non-commercial" operations are excluded.

Funds flowing into the area through interbank deposits and which do not go through the Federal Reserve System should perhaps be included to give a more complete picture. Unfortunately, these data are not readily available. However, it is the pattern of the movement of funds which is important in the comparison and not the actual dollar value. It is possible that the part played in the flow of money payments by these interbank deposits is either of minor significance or its percentage to funds flowing through the Federal Reserve System is relatively stable. If either is true, then their exclusion does not in any way invalidate this comparison.

The "Terms of Trade" series is a ratio of the prices of the commodities sold by the area to prices of goods purchased by the area from other areas. To indicate the relative economic position of the area in so far as prices are concerned, it is much more comprehensive than the familiar term, "parity prices," in that it considers all major "imported" and "exported" commodities and weights them in accordance with their volume. This series was made up for census divisions rather than for the Federal Reserve Districts, but the economy of the West North Central Census Division is sufficiently similar to the Ninth Federal Reserve District to warrant its use without further adjustments.

Several conclusions are very apparent. Most important, as stated before, is the high degree of dependency of this area upon other areas. Consequently, laws and measures designed to stimulate home consumption of locally produced goods must have minimum results on the economic prosperity of the area. If such measures in any way hinder or discourage sales to other areas, they must have an adverse effect upon the income level of the Northwest. Any measure designed to affect consumption habits of the citizens of the area, if it leads to retaliation by other areas, will also have injurious results.

Furthermore, because farm receipts are the product of prices and quantity, such concepts as "Terms of Trade" and "Parity Prices," while important, are frequently overemphasized. Farm income was considerably higher in 1939 than in 1935, yet in the
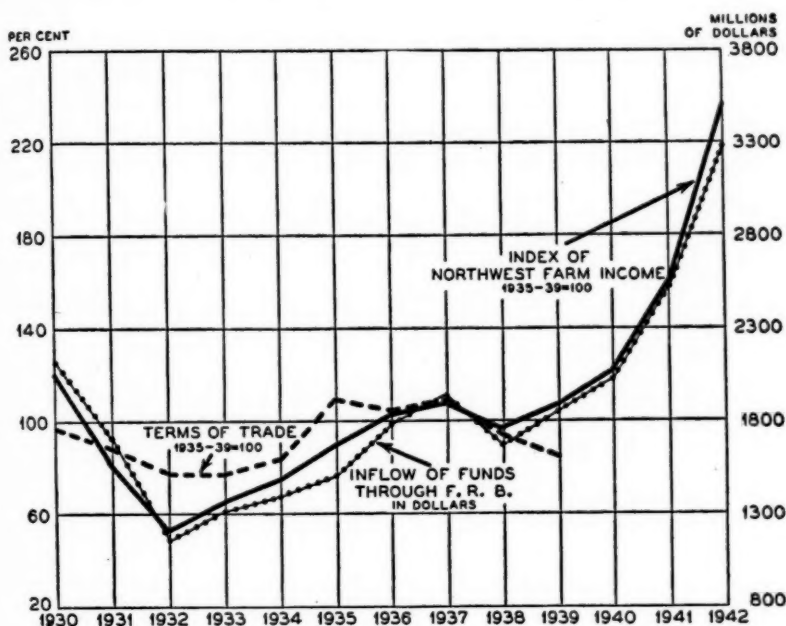
COMPARISON OF NORTHWEST FARM INCOME, INFLOW OF FUNDS, AND TERMS OF TRADE

former year both "Terms of Trade" and the ratio of Prices Received by Farmers to Prices Paid by Farmers indicated a more favorable price relationship for the area. It is possible that continued preoccupation with prices leads to price manipulation, which impedes the flow of funds into the area, thus leading to reduced incomes in the face of increasingly more favorable price relationships. Prices actually realized in market transactions are the true determinants of income in this case, not prices, however high they may be, which are not realized.

The flow of funds into an area is obviously determined in a large measure by the general level of business activity and employment in non-agricultural lines. Consequently, farmers must interest

themselves in, and actively sponsor, legislation and postwar plans which will encourage a high level of business activity in general rather than confine their thinking strictly to the agricultural segment of our economy. Removal of international trade barriers, if it stimulates this general prosperity, may lead to higher farm incomes in face of increased imports of specific agricultural commodities.

This comparison also gives some clues to the actual operation of our money mechanism. The high income levels of 1942 and 1943, are not, as many suspect, the results of huge direct Government expenditure for war contracts in the Ninth Federal Reserve District. Actually, during these years the Government has taken more money out of the area through sale of bonds and taxation than it has spent in the District. Purchasing power and consumption habits of the general population are the important factors. Money spent by the Government for airplanes in California and Detroit, given certain consumptive habits, will bring about increased farm receipts just as surely as will a direct subsidy.

One can draw few conclusions as to the final result of the inflow of such funds. What is done with the money? How much is again sent out of the area? Is it sent out through expenditures or through the purchase of Government bonds and other securities? Is it being used to liquidate indebtedness or spent to increase capital equipment? These and many other related questions would have to be answered in any attempt to analyze net results. However, in order to understand many of the economic problems of the area, it is first necessary that we see clearly how closely the prosperity of that area is related to the economy of other sections of the country and dependent upon their willingness and ability to buy its commodities.

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REVIEWS

New International Wheat Agreements, **Joseph S. Davis**, Stanford, Calif., Stanford University, Food Research Institute, November, 1942. Pp. 83. $1.00.

Paradoxically enough, the depression-racked, war-incubating decade of the 'twenties engendered a persistent brood of international commodity agreements in a world of cumulative economic nationalism. Although the surplus situations which these forms of international restrictionism were designed to mitigate have been violently reversed for most commodities under the impact of actual war, the latter has served to aggravate conspicuously the wheat surplus problem for overseas exporting countries. In a period, therefore, in which inter-Allied supply and allocation boards are forging new patterns of international commodity procurement and distribution, we find representatives of the same nations evolving new international wheat agreements of the restrictive type.

Although the first International Wheat Agreement, signed at London in August 1933 by representatives of twenty-two countries, broke down within a year, the Wheat Advisory Committee and Secretariat created under the agreement persistently strove through the 'thirties to achieve its objectives, and on the eve of the war had come close to reaching the basis of a new accord. Aggravation of the surplus situation in the Big Four wheat exporting countries in the course of the war led to the center of action being shifted from London to Washington where, as an outcome of protracted meetings through 1941 and 1942, a Memorandum of Agreement signed by representatives of United States, Canada, Australia, Argentina and the United Kingdom was made public in July 1942. This was accompanied by release of the text of a Draft Convention for submission to "a conference of the nations having a substantial interest in international trade in wheat" to be convened by the United States "when the time is deemed propitious." This Draft Convention—of which the five signatory nations have undertaken to put certain provisions into immediate effect—has been developed in elaborate detail, and has been hailed in certain quarters as a concrete model for the planning of "orderly international marketing in the postwar world."

It is with reference to the character of this pattern for "rationalising" international commodity trade, as well as to its specific appli-

cation to world wheat trade, that Dr. Davis of the Food Research Institute has undertaken his searching analysis. In this he has rendered a timely service, both in his careful exposition of the complicated articles of the Convention, and in his detailed, critical evaluation of its objectives and contemplated procedures on which most published comments have so far come from official sources. He regards it as fortunate that the text of the Convention has been made public before the main provisions have been brought into force, and feels constrained in the meantime to call attention to what he considers to be the limitations and dangers of international planning of the type represented by this agreement.

It is not the principle of intergovernmental action in dealing with the wheat problem that is challenged by Davis. "We are convinced," he says, "that valuable results may be achieved through realistic international collaboration, in the realm of wheat as in other areas." Nor is it the planning and initiation of such action in the course of war that he criticizes. "The world wheat position and the outlook are such that we believe it was high time to set up an International Wheat Council with important powers and duties." He regards as "timely and reasonable" the limited measures to which the signatories decided to give immediate effect, namely: (1) commitments to make national contributions to a relief pool of wheat, (2) commitment by the four chief exporting countries to adopt or maintain positive measures to control their wheat production, and (3) the immediate establishment of a permanent International Wheat Council to administer these international arrangements and others that may come into effect during and after the war.

While questioning the effectiveness of existing production control measures of the Big Four exporters and the purely official composition of the Council, Dr. Davis' fundamental criticism is that the provisions of the Draft Convention, which it is designed to apply at the close of hostilities, "are conceived in a restrictive spirit that is persistent and powerful," and that they "represent a refinement of prewar models, such as enjoyed a certain vogue when the world was racked by depression and distraught by fears of coming war." As such he finds them inconsistent with the principles of the Atlantic Charter, and even with the approvingly quoted declaration of policy contained in the Preamble of the Convention itself.

In the central sections of Dr. Davis' monograph he critically examines in turn the articles of the Convention dealing with *reserve stocks and production restraints*, with *export quotas*, and with *price regulation*.

The schedules of standard minimum amd maximum carryover stocks for the four signatory exporting countries envisage an international application of the "ever-normal granary" concept. Minimum reserve stocks are designed to insure consumers in importing countries against the risk of high prices resulting from seasonal shortages, while the maxima in combination with export quotas, are intended to establish the points at which production control measures become nationally imperative. Davis contends that the minimum carryovers specified "are needlessly, uneconomically high," and that if positive production restraints are desirable, they should be applied long before carryovers reach "the extraordinary high" standard maximum levels (aggregating 850 million bushels). Such an "ever-normal granary" formula, in combination with minimum price provisions, he asserts, "is calculated to perpetuate a wheat surplus."

While admitting that agreement upon basic export quota percentages (Canada 40, Argentina 25, Australia 19, United States 16) "was in itself a signal achievement," and that these percentages, however arrived at, "appear altogether reasonable," the author characterizes such stabilization device "as a move in the direction of indefinitely imposing on future trade a fixed pattern based largely on past averages." Nor does he fail to point out that the conventional allocation of an export quota to a particular country affords in itself no guarantee of exports to such extent, if its selling terms are out of competitive alignment. Attainment of quotas for certain countries supporting political prices for domestic producers may be realizable indeed only by subsidization, which the agreement itself does not obviate, but merely subjects to quantitative limits. In Davis' view "the United States has no just claim to export wheat if our exports will move only under subsidy."

The Washington Draft Convention differs significantly from the London Wheat Agreement of 1933 in including provisions for annual fixation by the Council of basic minimum and maximum prices for wheat entering into international trade.[1] Davis presents im-

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[1] Under the memorandum of Agreement these price-control provisions are to come into effect on the cessation of hostilities, with price determinations to be made

pressive reasons for finding "extremely unsatisfactory" the stated criteria for guiding the Council in the determination of minimum prices which will be (a) "reasonably remunerative to producers in exporting countries," (b) "fair to consumers in importing countries," and (c) "in reasonable relationship to prices of other commodities." While pointing out realistically the practical difficulties of pre-determining and enforcing appropriate minimum and maximum price-schedules for different varieties, grades and locations of wheats for export, his basic criticism is that the minimum price provisions will operate to prevent an economic solution of the wheat surplus problem. "With a commodity that tends to be produced in surplus amounts any basic minimum price should be low enough to induce heavy consumption of the commodity and to exert pressure on high cost producers, wherever they are, to quit producing wheat."

This is of course the crux of all commodity stabilization plans. Dr. Davis appears, however, to overstress the role of price in relation to wheat exports and consumption. There is substantial justification for Boals' assertion that during the 'thirties "low wheat prices, probably more than any other factor, were responsible for protective measures adopted for domestic producers in importing countries." While military, autarchic and foreign exchange considerations were also conspicuous factors in the efforts of certain European countries during this period to substitute high cost domestic for imported wheat, the fact remains that European agrarian protectionism has consistently represented defense against cheap foreign grain rather than against market exploitation by overseas exporters, and that restrictions were most drastic when world wheat prices were at the lowest level in trade history. Assuming a peace settlement which effectively removes the fear of political insecurity and affords reasonable assurance of ability to procure non-military imports by means of exports along multilateral lines, a system of basic minimum export prices for wheat, as contemplated in the Convention, might serve to remove the fear of "dumping" as a justification for continuance of high restrictions on wheat imports, and thus conceivably result in larger export movements.

by unanimous consent of the five signatory governments. In the absence of such action, export prices are to be maintained for six months at levels equivalent to "the last price negotiated by the United Kingdom for a bulk purchase of wheat from the principal country of supply" (Canada).

Dr. Davis attaches considerable importance to the influence of low prices in increasing consumption of wheat in Asiatic countries, as well as for feed and industrial uses. He admits however, that a differential price system might be applied to stimulate consumption in uses where demand is more elastic.

There can be little dissent from Davis' dictum that "one of the major obstacles to the wise evolution of wheat policies lies in political resistances to the cheapening of wheat." No economic solution to the wheat surplus problem can be realized so long as wheat prices are nationally maintained at levels which permit the continuation of production in high cost areas, in exporting as well as importing countries. Adherence of the latter to the agreement will have little significance unless such countries commit themselves to lowering of import restrictions.

In exporting countries the Convention as it stands will not interfere directly with the maintenance of domestic wheat prices above the minimum scale that may be established for export sales. In this country particularly we may fully expect farm bloc insistence on a two-price system, with exports resting on a subsidy or equalization fee basis. The principle of a guaranteed minimum price for wheat producers is a reasonable form of security for an industry which is peculiarly vulnerable to uncontrollable risks. In the interests of equilibrium, however, it is essential that such basic forward prices be set from year to year with reference primarily to the carryover situation rather than in accordance with cost of production or parity formulas. Canadian wartime wheat legislation affords an instructive application of such a policy.[2]

H. S. Patton

Washington, D. C.

American Agriculture 1899–1939: A Study of Output, Employment and Productivity, Harold Barger and Hans H. Landsberg. New York, National Bureau of Economics Research, 1942. Pp. 435. $3.00.

As a volume presenting a statistical summary of agricultural output, food consumption, agricultural employment, and productivity, this will prove especially useful to the large group of people working in other fields who are not intimately acquainted with the

[2] See H. S. Patton, Wartime Wheat Policy in Canada, Journal of Farm Economics, November 1942.

various scraps of agricultural information available in the miscellaneous publications and mimeographed releases of the Department of Agriculture.

It is difficult for one who has worked with agricultural data over a period of years to determine the new information that has been contributed by Barger's and Landsberg's volume. They give no review of the similar work already done in the field of consumption, output, and employment to which they expect to make a contribution. Such a statement in an introductory chapter would have been helpful as a basis for advising the reader as to whether he was to expect something new or merely a restatement and refinement of statistical series already in existence.

The contribution made by the authors appears to be first in compiling an index of output from 1897 to 1939 on a little different basis than the Straus-Bean Index, which covers the same period. This makes the fourth index of agricultural output for the period 1909 to 1936. The other two indices covering the same period were prepared by the Bureau of Agricultural Economics and Bressler and Hopkins in the recent National Research Project. The second contribution is a summary of available information on food consumption for the period 1909 to 1939 with an analysis of trends in the proportionate contribution of different food products to the total food supply. The presentation and analysis of historical data on food consumption is more complete than anything attempted heretofore. The analysis takes into account trends not only in calories, but also in vitamins and minerals.

Their analysis of employment in agriculture and productivity draws heavily on the National Research Project publications of 1937 and 1938, covering the studies carried on under the direction of John A. Hopkins. Their analysis brings in a few refinements, but it is doubtful if it adds anything significant to those studies. But here for the first time we have information summarized and synthesized which has been put out in a series of bulletins or mimeographed releases by the Department of Agriculture and the National Research Project—all closely related, all contributing to an over-all summary of the agricultural industry. This volume is the first one to bring all these data together under one binding.

When the authors go beyond statistical analysis and attempt to make interpretations of the significance of the trends and variations from year to year found in their data, one becomes distinctly un-

easy. The reviewer made notes of questionable interpretations as he read through the chapters. These were answered in the note by C. Reinold Noyes, Director of the National Bureau of Economic Research. Director Noyes, in a note following the chapter on "Summary and Conclusions," raises all the questions of interpretation of data that the reviewer would raise and in addition draws on his own historical studies to set forth some opinions on which others might disagree.

WALTER W. WILCOX

Food Distribution Administration

The Farmer Citizen At War, Howard R. Tolley. New York, The Macmillan Co., 1943. Pp. xi, 318. $2.50.

The title to this book is misleading as it is not primarily concerned with farm problems growing out of the present war. It consists of nine divisions or chapters. The first of these, "War on the Home Front," is a somewhat rambling collection of miscellany. Chapter II, "Agriculture's War Job and War Tools," reviews various agricultural programs of the 1930's. Chapter III, "The Federal System in War and Peace," recognizes dangers in bureaucracy but finds little to fear on this ground in case of the administration's agricultural programs. Chapter IV, "Pressure Groups in an Embattled Democracy," travels a circuitous route from extensive quotations from Thomas Paine, through farm organizations, to the use of farmer committees in farm programs. Chapter V, "The Farmer Helps with Government Chores." finds these committees very praiseworthy. Chapter VI, "A War of All the People," is mainly a discussion of the underprivileged. Chapter VII, "Non-Farmer Citizens and War," comes closer to discussing the current war than its predecessors. Chapter VIII, "Managerial vs. People's Revolution," evidently was suggested by James Burnham's book. The author is skeptical about trusting too much to experts but believes farmer participation safeguards the farm programs on this score. The final chapter, "A Democratic Peace," deals more with things desired than their attainment.

Mr. Tolley's prominence in the field will assure the volume wide reading among agricultural economists. What they will get from it, however, is a point of view rather than the results of analytical research.

The author at one time was the administrator of the AAA. He

now is chief of the Bureau of Agricultural Economics, the branch of the Department to which is assigned the task of making research studies of economic problems of agriculture. The book seems to show more influence of the former position than the latter. It would be interesting to have from his pen another volume growing out of the application of the rigorous analysis of which he is capable.

O. B. JESNESS

University of Minnesota

Food for People, Margaret G. Reid, New York, John Wiley & Sons, 1943. Pp. xv, 653. $4.00.

The materials relating to food have been widely scattered through many articles and monographs largely dealing with special phases of particular problems. The author has successfully woven a great bulk of this mass into a well rounded discussion of the economic aspects of the entire food problem. The size of this task is attested by the 268 different names listed in the author index. The data relate almost exclusively to the United States. The book will be of interest to all those concerned with the economic phases of the food problem. It will not only be an important reference volume but will also provide an excellent text for courses dealing with food consumption.

The study falls logically into three major parts: The Production of Food, the Consumption of Food, and Social Policy and Food Consumption. Among these the section on the consumption of food is probably the best. The selection of material is excellent and the discussion well rounded. The author begins with a discussion of our food habits and their changes, then proceeds to analyze the relation of prices, incomes and size of families to our food consumption and ends with a consideration of the adequacy of diets and the purchasing habits of consumers.

In the part on the production of food a better balance might have been secured by an expansion of the discussion of the utilization of our resources in the production of the various kinds of food. This is an important current problem in the administration to American agriculture. Family furnished food is without doubt important, but to devote 80 pages out of the total of 119 in this part to this phase of the production problem is probably unwarranted. In contrast there are but 13 pages on Improving the Quality of Foods.

Social Policy and Food Consumption covers a wide range and includes many problems which are controversial. The author provides an unbiased discussion of a number of the more important of these, such as taxes on margarine and chain stores, advertising and misrepresentation, grade labeling, monopoly practices in milk markets, and so on. On all of these as well as on other issues the arguments of both sides are presented but the author leaves no doubt as to where she stands. This section also includes in addition to these highly controversial issues a broad perspective of other social problems. There are discussions of the provision of food to the less fortunate through direct relief, the Stamp Plan and school lunches, of consumer protection and information, the reduction of marketing costs and control of monopolies as well as agricultural programs and wartime food controls. The speed with which our food picture changes, and with it Government policy, is illustrated by the discarding of some of the programs described here, and their replacement by others.

WARREN C. WAITE

University of Minnesota

International Protection of Wild Life, Sherman Strong Hayden, New York, Columbia University Press, 1942. Pp. 246. $3.00.

Brief in scope, this book presents in a direct but feeling fashion a review of the international agreements and treaties dealing with the preservation of wild life. There are only three chapters, a conclusion and an appendix of the texts of the more relevant conventions, treaties, and agreements. The first chapter deals with the preservation of natural communities and the struggle to achieve some unity in the protection of large game chiefly on the Continent of Africa. Next follows a chapter on the protection of birds and finally one on the conservation of marine animals (not fish) devoted entirely to problems relating to fur seals and whales.

The occasion for concern is the rising power of man to usurp, kill, and exploit and the infirmity of international agreements in a world of national rivalries. Agreement is not all, however, for there is not only the problem of enforcement but on occasion, consent may be given with the cynical reservation that enforcement abroad may enrich the harvest at home. Mournfully the author writes "Rare is the international mandate that successfully exacts a change in things as they are unless somewhere it whispers in the

governor's ear," "You don't really have to unless you want to."
(p. 53)

While accomplishment has been mixed there have been at least
a surprising number of conferences between nations that are the
necessary precedent to satisfactory agreements and programs of
action. Most satisfactory has been the achievement of the efforts to
restore and preserve the fur seals which were on the verge of ex-
tinction when action was finally taken. The American herd has
risen from 215,940 in 1912 to 2,185,136 animals in 1940 largely be-
cause of the protection achieved. For the whales the outlook is
less promising and the author states "It appears then, in melan-
choly distinction from the fur seal case, that while much has been
put on paper little has really been accomplished to protect the
whale, indeed, the entire effort has been close to ineffectual. Yet
could one but move with the restraint so rarely found in human
economies, these unique and fascinating creatures could surely be
preserved to be a wonder to our children and an enduring source of
wealth." p. 169.

The melancholy plight of the birds in Europe, where even song
birds are shot and trapped for food and where nest robbing is a
threat to preservation, is somewhat counterbalanced by the better
record of North America. On this continent treaties exist between
United States and Canada to the north and Mexico to the south.
A Migratory Bird Commission was created by the Congress of the
United States in 1929 and though Congress has cut rather than in-
creased its appropriation, "the commission could by 1937 point to
85 permanent refuges totalling 695,533 acres in 33 states and
Alaska . . . . There are also six million or more acres in large re-
serves created by special act . . . ." p. 84.

In general, "Achievement has measured up neither to needs nor
to hopes." More has been accomplished in the determination of
principles than in the field of enforcement. That is, treaties and
legislation are ahead of effective provision for enforcement and ad-
ministration. Lack of exact information is often a most grievous
stumbling block and an internationally supported "central informa-
tion office or its equivalent," is needed so that the cool and objec-
tive knowledge of research may be weighted in the scales against
prejudicial opinions with which it has so far commonly been so
difficult to cope in conference and out.

Peace must come again before there can be further progress in

international accord on wild life conservation. Perhaps out of the
present holocaust there will rise some form of international author-
ity that can build more effectively on the not so firm foundations
that presently exist the nature of which Dr. Hayden has so faith-
fully set forth.

<div align="right">CONRAD H. HAMMAR</div>

University of Missouri

Outlay and Income in the United States, 1921–1938, Harold Barger,
New York, National Bureau of Economic Research, 1942. Pp.
xxvii, 388. $2.50.

Until recently our national income estimates have been primarily
aggregates of "income" disbursements of business enterprises, on
an annual basis. The need for at least quarterly breakdowns in
business cycle studies has been generally recognized, and the war
has added to an already long list of problems in which a detailed
knowledge of consumer outlays and private investment would be
extrémely useful. Dr. Barger has therefore performed a major
service in supplying both of these needs for the two pre-war decades
(and similar series are now being presented currently by the Na-
tional Income Unit of the Department of Commerce). Although
Dr. Barger's findings are necessarily subject to considerable mis-
givings on the score of inadequacy of data, the work itself is ex-
cellently done and the results presented in a most refreshing
manner.

A first task is the establishment of an outlay series which is con-
sistent with Kuznets' income series (in *National Income and its
Composition*), which is accepted *in toto*. The corresponding concept
of outlay includes consumer goods and services, net investment of
business, and the governmental deficit. All of these items except an
independent valuation of consumer services are available in Kuz-
nets' work, and this omission is remedied by a special study (Appen-
dix A). We have then two estimates of the national product which are
conceptually identical. Statistically the two estimates are, if not
wholly independent, at least sufficiently so to lead to significantly
different estimates of income.[1] During this period outlay averaged

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[1] Barger feels that the two series are substantially independent (pp. 40–41);
I am less certain. Thus in 1938 $11,793 million of services out of a total of $22,285
million were taken directly or with modification from Kuznets' income series.
Extrapolation or interpolation of another $4,241 million was accomplished by the
use of income series. Thus in the services category alone content duplicated by at

103.4 percent of income (or about \$2 billion more a year) and varied from 99.9 percent in 1930 and 1938 to 107.6 percent in 1937 (p. 67).

The two series are compared at some length, both in general terms and by the use of variance analysis (Ch. III). The difficulties in separating the proportion of total outlay on commodities and services which represents consumer purchases may be a major explanation of the excess of outlay over income (pp. 70 ff.) and, conversely, the use of unaudited income tax data (or even of audited data!) leads to an underestimate of income (pp. 77 ff.). The application of variance analysis is a less informative step since it rests on dubious assumptions concerning the independence of observations. The general conclusions are that annual changes are measured more accurately than the absolute level (which is in doubt because of the common elements) and that the probability is one-tenth that the true value of the national product lies outside a range of 12 percent of the mean of income and outlay (p. 85). The outlay study thus emphasizes the considerable margin of error in national income estimates.

Any refined analysis of the two series seems premature, however, in light of the inadequacy of the data, especially in the services field. Since Dr. Barger's estimates have appeared, Mr. E. F. Denison of the Department of Commerce has offered independent estimates of outlays on services for the overlapping period, 1929–1941.[2] Differences in classification and the brevity of Barger's description prevent a detailed comparison, but a few sample comparisons are not wholly reassuring as to the state of our information. Some series such as doctors' services agree fairly well, but Barger's "other personal expenses" runs half a billion dollars under what appears to be Denison's comparable series. Denison attributes 70 percent of passenger car licenses to consumers, Barger 85 percent. Denison estimates 1929 expenditures of consumers on postage at \$84 million; by another method Barger arrives at \$338 million. The movements of important series are dissimilar, as with amusement and dues (the figures are in millions of dollars):

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least 40 per cent and annual changes by about 70 per cent (or one-fourth of national income). This is of course not the whole extent of duplication—for example, an average of more than \$1 billion of imputed value of food produced and consumed on farms is in both series (p. 43).

[2] Consumer Expenditures for Selected Groups of Services, Survey of Current Business, September, 1942.

Year	Denison	Barger
1929	$1,633	$1,788
1933	1,063	892
1938	1,544	1,257

If careful workers can arrive at such diverse conclusions one must necessarily use such series with great circumspection.

The final task is the construction of quarterly income and outlay series. The paucity of data forces Dr. Barger to make frequent use of poor interpolators (e.g., production rather than sales) and to use mechanical methods at numerous points. In addition the estimation of inventory changes and corporate profits on a quarterly basis offered grave difficulties.[3] Despite these and other problems the two series agree rather well in their movements: for example, the signs of 56 out of 71 quarterly changes agree, and the agreement is especially good after 1929 (but in part because almost any broad series would show a decline for about 13 quarters in 1929–1933). With unusual self-abnegation Dr. Barger accepts the view that both the annual and quarterly income series are more reliable than his own laboriously constructed outlay series.

I have emphasized the preliminary nature of these figures, not because Dr. Barger disguises this fact—his statement is as frank and informative as anyone could well ask—, but because in light of their probable wide use their limitations should be kept in mind.

GEORGE J. STIGLER

University of Minnesota

International Agreements on Conservation of Marine Resources, Jozo Tomasevich, California, Food Research Institute, Stanford University (Commodity Policy Studies, No. 1), 1943, Pp. 297. $3.00.

This well-organized and excellently written book on conservation of marine resources is presented by the Food Research Institute as the first of a series of studies on international commodity agreements. Later studies, now in preparation, will deal with coffee, tea, sugar, rubber, tin, and other commodities. In view of the direction

[3] More recent figures are provided quarterly by Tynan Smith and Charles Merwin, Corporate Profits and National Income, Quarterly, 1938–42, Survey of Current Business, June, 1942. Only in 1938 do the two estimates overlap; in that year agreement does not seem too good but appropriate corrections for differences in income concepts would be necessary to be sure. It is to be hoped that the Commerce and National Bureau series, here as well as in the outlay field, will be compared in detail by one of these agencies.

in which post-war international relationships appear to be headed, this series of studies should prove to be both timely and significant. Because of the similarity of problems involved in negotiating international commodity agreements, the present work will be of interest to political economists generally as well as to individuals concerned with fisheries.

The book is organized in five parts: (1) general considerations, (2) fur seals, (3) Pacific halibut, (4) Fraser River sockeye salmon, and (5) appendix notes, dealing with fisheries in European waters, whaling, and Great Lakes fisheries. The discussion of whaling is based chiefly on Karl Brandt, *Whale Oil: An Economic Analysis*. The appendix notes contain useful material which might well have been expanded, even though successful conservation agreements with regard to European and Great Lakes fisheries and whaling have still to be concluded.

Most international fishery agreements have the same ultimate purpose, namely, the conservation and rational exploitation of marine resources. Measures taken, however, frequently fall short of the mark. Some of the agreements have at first been only for the purpose of scientific investigation of a fishery later to be the subject of a conservation scheme. Other agreements merely legalize existing practices of contracting nations, usually to forestall the development of gear more destructive of the resource than the gear in current use. More definite measures of conservation include closure of nursery grounds to fishing, establishment of a closed season during the year, and establishment of annual quotas of catch. The first two of these measures the author regards as of minor importance for most fisheries, but annual quotas of catch are regarded as basic. The establishment of over-all quotas is not difficult in itself; the chief point of dispute, and the one on which international negotiations usually break down, is the division of the general quota into national quotas. This problem was successfully solved in the North Pacific fur-seal agreement, the Pacific halibut agreement, and the Fraser River sockeye-salmon agreement. An effective whaling agreement was prevented by the inability of the United Kingdom, Norway, Germany, and Japan, the principal whaling States, to agree on an apportionment of the catch.

In the case of North Pacific fur seals the yearly catch has been determined by the United States, in whose territory the rookeries are located (the Pribilof Islands). The catch—a monopoly of the

United States—has been divided among the United States, Canada, Russia, and Japan on a prearranged percentage basis. In return for a share in the catch, the countries concerned agreed to a prohibition of the killing of fur seals on the high seas, which had threatened destruction to the entire industry. In the case of Pacific halibut the quota of catch is decreed annually by an international commission. The division of catch between Canada and the United States is left to the play of economic forces and to the industry. No over-all quotas have been established for Fraser River sockeye salmon, but the treaty concerned with this fishery provides for an approximately equal division of the catch between Canada and the United States. Although Japan withdrew from the fur-seal agreement in 1940, the author regards the fur-seal agreement and the Pacific halibut agreement as having been highly sɪccessful in promoting conservation of resources. The salmon treaty does not come into full force until 1945.

One of the striking features concerning international fishing agreements is the length of time required to bring successful agreements into operation. First attempts to restrict pelagic sealing by international action were made in 1877. Further action was taken in 1893 and 1897, but it was not until 1911, when the seal herd was seriously depleted, that a workable agreement was reached. An American-Canadian halibut conservation program was first discussed in 1918. A treaty followed in five years, but this provided only for a closed season and a study of biological problems. New treaties providing for annual quotas of catch were concluded in 1930 and in 1937. Discussion of a joint American-Canadian sockeye-salmon regulatory system began in 1892, but it was not until 1937 that an international convention to that effect was ratified. Joint controlling actions are not to take effect until 1945, following a thorough investigation of the fishery. Protection of fish in the North Sea by international action was urged as early as 1892. An international convention was concluded in London in 1937, but was not ratified by all contracting parties. Pelagic whaling activities were regulated to some extent by unilateral and bilateral actions beginning in the 1920's. An international convention to regulate the whale catch was proposed by the League of Nations in 1931 and became effective in 1935, but without the participation of Japan, Russia, Chile, or Argentina. This was a very modest beginning, and contained only minor conservation features. A new agreement was

concluded in 1937 and strengthened in 1938, but Japan, Russia, and Chile again declined to participate.

Some general observations with regard to effective international commodity agreements may perhaps be drawn from this stimulating book on conservation of marine resources. It is evident that such agreements are not easily made, that they take time, study, and good will. The difficulties in the way of obtaining effective agreements appear to multiply rapidly as the area of the agreements widens. Price-supporting agreements for agricultural commodities on an international scale, such as may be attempted after the war, undoubtedly will present new problems. But many of the same political and economic difficulties involved in the case of fishery-conservation agreements are likely to be met.

ROBERT M. WALSH

Bureau of Agricultural Economics

Land Tenure in Process, L. A. Salter Jr., Madison, Wisconsin, Wisconsin Agricultural Experiment Station, Res. Bul. 146, 1943, 49 pp.

Land tenure is a "ticklish" subject in many quarters. The orthodox fee simple system of this country is one of our most idealized institutions; often to the extent that fallacies and problems evoked by the system are overlooked. Laymen and professional thinkers, alike, have failed and refused to consider the disadvantages, along with the virtues of private fee property *per se*. Unfounded idealism may be resulting in an ignorance of the very difficulties that may be undermining our democratic property system.

Professor Salter has presented a real contribution to the explanation of some basic farm tenure problems in the United States. Although his area of study was a single rural township in Lafayette County, Wisconsin, many of the relationships are more or less applicable in all sections of the country. At least, the way is paved for additional research of this character. Moreover, Salter's contribution is twofold. In addition to his factual presentation, he demonstrates the use of a research technique which has been ignored for too long. The "cross-sectional and case grouping procedure" employed in this instance is an attempt to get away from the traditional "averages" which tend to obscure the actuality of much socio-economic data. This technique might be described as one of following specific attributes from their source to the results for

single cases and groups of similar cases. Thus, relationships bearing on the problem can be developed, which would likely be ignored, or never uncovered, in the usual statistical sorting analysis.

In this commercial agricultural country in southern Wisconsin, which was settled shortly after the Civil War, the percentage of farms operated by tenants was reported by the Census of 1940 as 54 percent. The *objective* of this study was to determine how this tenure condition came about, and what is likely to happen to it in the future. Records of tenure histories and current tenure status for the 125 farms in the township were sorted into five categories, according to the type of tenure and the manner by which the particular tenure status was achieved. The analysis broke these categories down into case-groups bearing similar significant attributes. This analytical technique made it possible to relate pertinent facts directly with any apparent causes and effects.

The author observes the process by which the land of this rural town, much of which was acquired in fee, clear of encumbrance, not more than two generations ago has developed into an economy of farm tenancy to a large extent. More than this, the equity held by owner-operators in their farms is rapidly decreasing. In the absence of inheritance without encumbrance, with few exceptions, each generation is forced to accept a financial obligation which is more than can be paid conveniently from farm earnings during a single generation. As a result the equities achieved by each succeeding generator of operators is smaller than that of the one preceding.

Contrary to the idealism that farm owner-operatorship is virtuous *per se* the trend toward non-operator ownership and tenancy is disturbing. With the equity held by farm-operators, for the United States, decreasing from about 50 percent in 1910 to about 42 percent in 1940, there may be reason to question the possibilities of realizing owner-operation of family farms over a long period. Increasingly high mortgage debt is not only conducive to soil exploitation and the neglect of other capital resources, but it may limit a reasonable level of living.

Throughout the analysis the author carries a torch of boldness. When he comes to the point of suggesting 'What Can Be Done," however, the flame of progress seems to burn low. In suggesting possible lines of action, his emphasis is on father-son transfer (inheritance) without encumbrances; and revision of inheritance laws whereby sons would be given credit in estate sharing for assistance

to aged parents, and for interest in operation of home farms. There still remains a large proportion of farm properties which cannot be reached by such action, because of no heirs interested in farming. Furthermore, tenancy is almost inevitable as former farm operators wish to retire and rent farms as a source of income, and as credit institutions and others hold farm lands as an investment.

This analysis is thorough. The methods permitted unusual clarity in factual relationships. A single suggestion is offered by this reviewer. The analysis of the several case groups is heavy reading, and difficult to follow. Perhaps a few brief tabulations would have been a more concise way of presenting much detailed data. The coded statistics presented as an appendix are practically useless, without translation.

E. C. WEITZELL

Bureau of Agricultural Ecnomics

Legal Phases of Cooperative Associations, L. S. Hulbert, Washington, D. C. Bulletin 50. Cooperative Research and Service Division, Farm Credit Administration, May, 1943. Pp. 456. 55 cents.

Everyone who has worked with agricultural cooperative business enterprises is familiar with the work of L. S. Hulbert on the legal aspects of cooperatives beginning with his first publication in October, 1922, as U. S. Department of Agriculture Bulletin No. 1106.

The present bulletin is stated in the foreword to be the third revision of the original bulletin. It is much more than that. It is a complete summary and analysis of present-day cooperative law together with well-considered opinions on the economic phases of cooperative enterprises and their business, management, and financial policies. Herein lies the special significance of the bulletin. The author points out paragraph by paragraph how the legal structure of a cooperative can be built to implement sound policies.

Mr. Hulbert's intimate experience, for more than a quarter of a century, with the problems of cooperatives makes his opinions and conclusions on cooperative affairs of especial significance. It is these the reviewer will stress rather than the strictly legal phases which are covered in a complete manner.

Adequate volume, sufficient initial capital, and sound management and business policies, he holds, are the dominant factors for

success or failure in agricultural cooperative enterprises. Some of his comments on business and operating policies follow:

"The revolving-fund plan of financing is believed to be the most practicable way of insuring that ultimately all the major contributions of patrons to the assets of an association may be returned to them. The fairness of the plan should make it easier for an association to obtain members and to build up adequate capital."

"Provision should be made in the bylaws for showing the reserves by years on the books of the association in such a way that the amount attributable to the patronage of each patron may be ascertained at any time. If the reserves are substantial in amount, individual book credits should be set up. The board of directors, in the event of a loss, should be authorized to reduce the reserves for the respective years on such basis as they deem equitable. Provision should also be made, especially if the association is to have substantial reserves, that these reserves be revolved by years. No certificates should be issued to evidence reserves although they have the status of capital."

"In the case of purchasing associations, students of cooperative purchasing generally agree that such associations should handle supplies at prices not less than the going market prices therefor, and should provide for the building up of reserves and capital out of earnings."

"In most instances, it is believed desirable to have the compensation of directors, if any, determined by the members of the association, and to provide in the bylaws 'that directors shall be barred from holding the office of manager, and be restricted in the amount of special work they may do, for pay, for the association in any given year.'"

Numerous observations on the legal structure and control of cooperatives that the author believes to be good policy are made:

"Ordinarily it would appear preferable to have the pre-organization contract so drawn that it is effective and binding from the signing thereof but subject to cancellation in the event the required sign-up is not effected by a certain time."

"From the standpoint of controlling the character of the membership, it is believed that this generally may be more easily accomplished by a nonstock association."

"While voting by proxy is permitted in a number of the states, the practice of voting in this manner is not generally regarded with

favor, since it tends to concentrate voting control in the hands of a small group. Consequently, the writer is of the opinion that proxy voting should either be prohibited or at any rate restricted so that one person may not cast more than a limited number of proxy votes, as, for example, five votes."

"Although generally, from a strictly legal standpoint, it is not necessary that minutes of meetings of an association or of its board of directors be kept, it is highly important that this be done."

"If a manager or an officer of an association is exercising more authority than its board of directors deems he should exercise, the board should prescribe the limits of his authority and persons who have previously dealt with the association, such as banks, should be specifically advised of the limits of his authority."

"Generally speaking, a bylaw providing for the giving of notices of meetings by mail should be so worded that the effectiveness of the notice will depend on its mailing rather than on its receipt."

"In order to have the marketing contract pass title to the products covered by it, prior to the time the products are delivered to the association, the marketing contract should read so as to make plain that it is a contract of sale rather than a contract to sell."

"In the interest of operating efficiency an association should have broad powers of sale . . . ."

"In drafting a provision for liquidated damages, care should be taken that the rule for ascertaining the damages will be fair, equitable, and clear under all circumstances."

The foregoing quotations show a broad knowledge of the operations of cooperative associations. The treatise is well-organized and indexed. It represents years of research and analysis.

In closing the author presents suggested organization forms but cautions that they should be checked, altered, and modified to meet the local needs and legal requirements of the state in which the association is to be incorporated by a competent attorney. It is well to bear this caution in mind. It would also be advisable to obtain the legal forms used by a specific organization operating with a given commodity for study before organization papers are drafted. Too frequently the reviewer has witnessed attempts merely to copy the legal structure of some association somewhere without consideration of the specific undertakings of a given enterprise.

E. A. STOKDYK

Berkeley Bank for Cooperatives

Wartime Farm and Food Policy, Ames, Iowa, The Iowa State College Press, 1943. 20 cents. A series of pamphlets dealing with wartime agricultural policy: Pamphlet No. 1, Food Strategy, Margaret G. Reid; No. 2, Farm Prices for Food Production, Theodore W. Schultz; No. 4, Food Rationing and Morale, C. Arnold Anderson; No. 6, Commodity Loans and Price Floors for Farm Products, Geoffrey Shepherd; No. 7, Using Our Soils for War Production, Arthur C. Bunce.

Whether one agrees or disagrees with the views expressed, this series (including the titles listed, others which have so far appeared covering the dairy situation, inflation and food management, and the coming land boom, and several which are still to appear) is interesting. It is interesting in that it attacks a situation and a series of issues which must be faced, as much as many of us would like and will try to duck; in that the several pamphlets are so written, so printed, and so bound that one suspects they were designed to force attention; in that the statements and suggestions of some of the authors are so specific and so easily understood as to serve, at least to some extent, as examples of the academic freedom which research men so often praise and so rarely practice; and interesting in that a sincere effort has been made to write about certain central issues, to organize facts and analyses in the direction of suggestions for an actual program, and to reach the public while the material is still alive and the issues still controversial.

What reception this series may receive from the general public or from the more critical professional group would be difficult to forecast. But it certainly deserves as good and I suspect a better reception than will be accorded. Whatever one may feel about price control, about rationing, about the ever increasing number of restrictive orders and regulations governing production, distribution, and consumption, or about "red tape" and bureaucratic government, there can be no doubt but that more and more orders, more and more restrictions, and more and more difficulties are ahead until such time as at least one and perhaps both our chief enemies shall have been defeated.

Schultz, Reid, and the others who are authors or members of the editorial board for the series realize this, realize that drastic changes are necessary to successful mobilization and that a small number of people working at cross purposes, "a few laggards," can

slow down the whole effort unless the government is given and uses the authority to go ahead. At the same time, they feel that authority is not a substitute for general acceptance and understanding, that the citizens of a democratic nation "must know what has to be done in economic mobilization—and why and how." And this is their endeavor to supply the background for such an understanding with respect to food and the farmers' share in the war effort.

Setting the general theme for the series, Reid indicates that advance planning is preferable to dead reckoning, that both national and international action is required, that reserve supplies should be accumulated, rationing extended, and a continuing educational program developed, that more efficient use of agricultural resources should be attained with all possible speed, and that efforts to maintain the status quo should give way to increased attention to the shifts which will be needed in the post-war world. Anderson further examines the need for rationing and its relation to morale and Bunce discusses the means for minimizing soil erosion at the same time that the cropping of farm land is increased, while Schultz and Shepherd attack the price problem and its relation to food.

Schultz and Shepherd both argue for increased flexibility in the price field, both agree that the parity standard is a serious obstacle to establishing desirable relationships as between commodities, and both feel that the risk and uncertainty to which farmers are accustomed should be replaced by a set of "forward prices" so determined as to encourage the desired shifts or increases and announced in advance for each marketing year or production period. Schultz also discusses criteria for setting goals and indicates that feed should be converted into animal products, even to the extent of reducing feed reserves to the minimum, that there should be a shift toward cereals and potatoes in the national diet, that the consumption of whole milk or its equivalent should be increased at the expense of the great quantities of skim milk which are now wasted or used for livestock feed, that food crops should be substituted for short staple cotton in the South, and that transport and preserving facilities should be economized.

Anyone who wants to argue or criticize can find something to differ with in each of the pamphlets so far issued. There are in fact a considerable number of analyses, statements, and suggestions

with which the reviewer cannot agree, even though the general argument is accepted. Schultz feels that our stocks of feed grains should be reduced to a minimum while I fear that this is going to happen much sooner than it should. Schultz and Shepherd seem to conceive of parity as simply a set of arbitrary prices which should be outlawed. Perhaps, but I feel that this approach to parity is too simple and that their argument for a set of (scientific) forward prices is over-stated. Some of the suggestions for changes in the current food program crowd the actual event. But all this is irrelevant. If the purpose of the series is to supply an adequate background for a free discussion of the wartime farm and food problem, it has been achieved. And if the authors are able and willing to offer specific suggestions for action, they are to be complimented.

O. V. WELLS

Bureau of Agricultural Economics

Manpower in Agriculture, Rainer Shickele. Pamphlet No. 3 in the Series, Wartime Farm and Food Policy, Ames, Iowa, Iowa State College Press, 1943. Pp. 50. 20 cents.

As a general statement of policy considerations for achieving more effective use of manpower in agriculture and of agricultural manpower in the war effort, the pamphlet provides a forthright and concise expression of the author's appraisal of certain basic problems in agriculture—excess population, underemployment, and low wages. The problems, long recognized, are ably examined by the author from the standpoint of immediate policy implications for the wartime job of maximum food production and for a balanced allocation of manpower among the armed forces, war industry, and agriculture.

It is on the score of the quantitative data presented in support of the findings and recommendations that the technical worker in the field of agricultural labor will not be entirely satisfied. There is no explicit recognition in the body of the study that many farm residents and farm workers are employed in nonagricultural occupations. This fact makes it difficult to appraise the author's generalizations regarding the extent of underemployment of farm workers. Also one wonders what is meant by "slack in the use of labor" when on the one hand the author speaks of little slack in the use of seasonal workers (p. 37) and on the other hand emphasizes the loss of

considerable work-time between jobs by migrant farm laborers as a result of uncoordinated movement and demand for such workers.

There is a lack of care in the handling of some of the data and inadequate explanation of the bases for certain estimates. Estimating nonagricultural employment for a current or past year by subtracting the Bureau of Agricultural Economics estimates of farm employment and the Bureau of the Census estimates of unemployment from the Census civilian labor force figures is invalid, since the Bureau of Agricultural Economics estimates of farm employment include persons who are under 14 years of age and many persons primarily employed in nonagriculture.

In a somewhat similar category of lack of precision is the author's failure to distinguish between additions to the labor force through the net increase in persons of working age and additions to the total population due to the excess of births over deaths. As a source of current replacements of farm workers, it is only the former which is relevant. Yet the author lists as the first factor in maintaining the number of farm workers during the 1940–42 period "an increase in the farm population of over 1 million due to the high birth rate" (pp. 8–9; a similar statement occurs on pp. 13–14).

The presentation of certain estimates, such as the 1.5 million farm workers who could be spared from agriculture, without detailing the basis of the estimate is not particularly illuminating. Estimates of the size of the year-round farm labor force (Table 2) rest on rather questionable assumptions. In Table 8 the farm wage bill figures are not comparable for the several years, due to the inclusion of value of board, lodging, and other perquisites in one year and the apparent exclusion of these items in other years, and thus provide erroneous comparisons of farm wage bill changes and of the proportion of income expended for wage payments.

While the above defects in the handling of data relied upon for supporting evidence to the findings and conclusions of the study cast some reflection upon the order of what the author terms the "workshop of an economist," fortunately, the main weight of the findings rests upon an inherently sound appraisal of effective policies for maximizing agricultural production and for making fuller use of the manpower now on farms in the nation's total war effort.

LOUIS J. DUCOFF

Bureau of Agricultural Economics

Food in Wartime, Berkeley and Los Angeles, Calif., University of California Press, 1942. 25 cents per copy. A series of pamphlets dealing with economics of food in wartime: Rationing and Control of Food Supplies, J. M. Tinley; Wartime Transportation and Distribution of Foods, J. M. Tinley; Planning for Total Food Needs, E. C. Voorhies; Farm Problems in Meeting Food Needs, R. L. Adams; Adapting Fruit and Vegetable Products to War Needs, W. V. Creuss, M. A. Joslyn, and Gordon MacKinney; Control of Food Prices, J. M. Tinley.

This series of pamphlets undertakes the task of informing the general public about the food problems of a nation at war. The experiences of the United States, Great Britain, and Germany— both in World War I and in World War II—are touched upon; but most attention is given to current problems in this country. References to other countries are made to show differences in food problems and methods of handling them rather than to present a detailed account of foreign experiences.

The pamphlets were published in the first half of 1942 and therefore do not cover recent happenings on the food front. They are listed above in the sequence in which they were published, but it is desirable to consider them in slightly different order.

Planning for Total Food Needs is concerned with the general problems of a nation in supplying wartime food needs. In wartime the usual channels of trade between countries are disrupted, and countries dependent upon imports are forced to take special steps to make the best use of their food resources. These steps may include expansion of production as well as control over distribution of available supplies. A brief examination of the geography of food production and world trade in food products in the pre-war period shows that there are wide differences among countries with respect to dependency upon imports. Before the war Great Britain imported about 65 percent of her food requirements, while Germany imported about 20 percent. Beginning in 1933 Germany took steps to become self-sufficient, but Great Britain took no important action to safeguard her food supply until the outbreak of the war. Unlike Great Britain and Germany, the United States is self-sufficient with respect to most food items, and the food problem arises mainly because of increased export requirements for war purposes, although increased domestic requirements are partly responsible. The importance of a well-fed population is recognized by nations at war although it may not be in peacetime.

Farm Problems in Meeting Food Needs points out that because of
the peculiar characteristics of the farming industry expansion in
total output as well as in individual products are more limited in
agriculture than in manufacturing industries. In view of recent
accomplishments, too much emphasis probably is placed on the in-
flexibility of agricultural production. Annual agricultural output in
the United States now is one-fourth higher than the average 1935–
39 period while output of certain farm products has increased even
more. For the most part, the farmer's task is to continue producing
the same products as before the war rather than shift completely
to some new product as frequently is the case in industry. In any
event, an over-all expansion in food production is limited by the
available supply of farm resources, and further expansion in this
country now is severely limited by shortages all along the line. The
United Kingdom has added 6 million acres to a total of 13 million
acres in crops before the war, but attainment of this goal does not
go very far in making her self-sufficient. Germany began early in
1933 to overcome a shortage of fats and protein feeds, but available
evidence indicates she has been only partially successful.

Rationing and Control of Food Supplies was written early in 1942
before most of the present rationing programs in the United States
were put into effect. A good explanation of why rationing is neces-
sary to make the best use of food supplies is given here. The dis-
cussion of rationing and control over food supplies in World War
I shows that programs then in effect were only partially successful
in accomplishing their objectives. It is significant that enforcement
of controls broke down in Germany with extreme food shortages.
This could happen again although enforcement of controls now is
much more effective. British experiences during the last war helped
set the pattern for present rationing programs. However, the
greater shortages of supplies during the present war has required
that much more control be put into effect. This also has been the
experience in the United States.

The author of *Control of Food Prices* discusses the basic reasons
for inflation in wartime and concludes that inflation can be checked
if the appropriate measures are put into effect and carried out. But
administrative difficulties may make complete stabilization of food
prices impossible. He holds the view that "price control should em-
brace all important commodities and services including wages and
foodstuffs, and that control, if it is to be effective, must be applied
in all stages of the marketing process." Price control in Germany
broke down in the last war, together with rationing programs, be-

cause of insufficient control over supplies. Any country that obtains a large part of its food from home production faces a difficult task in regulating the sale of food. Prices have been maintained at a lower level in Germany during this war due to a well developed system of enforcement. Both the United States and the United Kingdom were slow in putting price regulations into effect, but they now are regarded as much more complete than those that prevailed in the last war. However, food shortages now are much more acute, and a stronger system of price controls is called for. Canada is referred to as a nation which has developed a successful program of price stabilization.

Wartime Transportation and Distribution of Foods shows how disruption of normal trade between countries and the necessity for greater economy in distribution of food for domestic use affects transportation and distribution. The United Kingdom has met her acute transportation problem by using available ocean-shipping facilities to import foods highest in nutritional value relative to bulk and weight. Economies in distribution which have been put into effect in order to release resources for other uses, include reduction in number of food brands, elimination of unnecessary packaging and delivery services, and rigid control over the use of tranportation facilities. As in the case of food production, transportation and distribution problems in the United States are caused largely by increased food requirements for export although changes in domestic requirements resulting from the war also are important. For shipment abroad, foods must be put in concentrated form that can easily be stored. The distribution system should be reorganized so as to require less manpower and materials. As illustrated by the milk delivery system, the possibilities for economies in food distribution are considerable.

Adapting Fruit and Vegetable Products to War Needs is concerned mainly with changes in methods of food preservation to meet shortages of material and to supply foods in the forms in which they may be shipped long distances. The most dynamic development has been the increase in production of dehydrated vegetables. It is significant that a similar expansion, although on a smaller scale, occurred during the last war. A shortage of tin has prevented an expansion of canned vegetables and fruits sufficient to maintain civilian consumption and at the same time supply military and lend-lease requirements. Dried fruits are the most economical form in which to preserve fruits for shipment over long distances. Al-

though fruit production cannot be expanded quickly, more dried fruits may be obtained by drying a larger proportion of the fruits produced.

Any evaluation of a series of pamphlets such as this should be made from the standpoint of its success in presenting important facts to the public in a manner in which they may be easily understood. In this respect they are successful. Each pamphlet is clearly and interestingly written.

The pamphlets present a background of information for the student who may desire a general understanding of food problems in wartime. However, they do not give a detailed and documented account of present happenings such as may be desired by the more careful student. There is little detailed analysis of the effects of current policies in handling food problems or suggestions for improvement. But this is understandable if it is recognized that the authors have attempted to cover many different aspects of the food problem both at home and abroad in a few short pamphlets.

RAYMOND P. CHRISTENSEN

Bureau of Agricultural Economics

NEWS ITEMS

The American Society of Farm Managers and Rural Appraisers held a very successful summer meeting on the campus of the University of Illinois in cooperation with the Illinois Farm Managers Association. The Department of Agricultural Economics in the University of Illinois took a prominent part in the program, including a tour of the Experimental farms at Urbana, and a visit to five successful central Illinois farms.

Several Bureau of Agricultural Economics officials, in addition to the Chief of the Bureau, who served as advisor to the American delegation, were members of the Secretariat at the recent United Nations Conference on Food and Agriculture, serving on the press relations staff and in three of the four Sections of the Conference—those dealing with consumption levels and requirements, expansion of production and adaptation to consumption needs, and facilitation and improvement of distribution. Prior to the opening of the Conference, the Bureau directed the work involved in preparation for it by the Department of Agriculture and numerous members of the Bureau Staff were occupied jointly with other Department agencies in the compilation of eighteen of the twenty documents presented to the conference by the United States delegation. This material is now available in mimeographed form.

The Bureau of Agricultural Economics has undertaken, as a Bureauwide project, a study of farm wage rates with special reference to methods and criteria in determining "prevailing" rates, "fair" rates, etc. The project is intended to include two major lines of activity: (1) collection and analysis of data now available, and (2) special studies of the wage structure in relation to farm employment in a number of selected areas. Attention will be directed toward such topics as the distribution of wage rates above and below average rates; variations in relation to season, size and type of farm, skill, etc.; the importance of hired labor in different areas; factors influencing farm wage rates; effects of differentials in wage rates upon labor supply; relation of piece rates to time rates, etc. Both the Washington and regional offices will participate in this project; cooperation of interested staffs in state institutions is sought.

An *Analysis of Specified Farm Characteristics for Farms Classified by Total Value of Products* has just been completed as a cooperative study by the Bureau of Agricultural Economics representing the United States Department of Agriculture and the Bureau of the Census. The tabulations were based upon a two percent sample from the 1940 Census of Agriculture expanded and adjusted to agree with the recorded census totals. They are intended to help answer questions concerning the resources of farms at different levels of gross farm income and the characteristics of the operators of farms in the various value groups which influence their potential agricultural production; to show the extent to which farms in the different value groups are operated by full-time or part-time farmers; to indicate the amount and kind of work done off the farm in 1939; to help uncover

sources of unused and underused manpower; and to provide useful data on farm labor requirements and farm expenditures. Many of the data will be helpful in analyzing the problems associated with social security programs for farmers.

The following reports have been published: (1) Age of Operator, Work Off Farms and Days Worked, Operators Reporting Residence not on Farms Operated, 1940; (2) Workstock and Other Livestock, Specified Farm Machinery and Facilities, Business With or Through Cooperatives; (3) Land Resources and Size of Farm; (4) Appalachian Region, which includes data relating to Virginia, West Virginia, North Carolina, Kentucky, and Tennessee; (5) Specified Farm Expenditures; (6) Family and Hired Labor on Farms, September 24–30, 1939, and March 24–30, 1940; (7) Farms Classified by Major Sources of Income; (8) Color and Tenure of Farm Operators. A limited number of copies are available from the Bureau of Agricultural Economics, United States Department of Agriculture, Washington, D. C.

Leslie J. Adkinson, recently with the Soil Conservation Service, has joined the Division of Farm Management and Costs, Bureau of Agricultural Economics, as Assistant Agricultural Economist, assigned to the regional office at Upper Darby, Pennsylvania.

G. H. Aull, Department of Agricultural Economics and Rural Sociology at Clemson College, is serving as part time public member of the War Labor Board in Region IV. He also was recently elected a member of the Board of Trustees of the Penn Normal, Industrial and Agricultural School, St. Helena Island, South Carolina.

R. O. Bausman of the Department of Agricultural Economics, University of Delaware, has taken a temporary position with the United States Department of Agriculture, Program Analysis Division at the rating of Senior Agricultural Economist.

Russell W. Bierman has joined the Division of Farm Management and Costs, Bureau of Agricultural Economics, at Washington, D. C., as Junior Agricultural Economist.

W. K. Bing has resigned his position as Assistant Professor of Agricultural Economics at Clemson College, South Carolina, in order to accept work with the Food Distribution Administration with headquarters in Atlanta, Georgia.

Robert E. Bowlus, Instructor and Research Assistant in the Department of Agricultural Economics, College of Agriculture, Louisiana State University, resigned June 24 to accept a position as Associate Economist in the cotton section of the Office of Foreign Agricultural Relations. He will work under Dr. P. K. Norris, gathering statistics regarding world production and acreage of cotton.

W. D. Buddemeier, formerly Associate in Agricultural Economics Ex-

tension, University of Illinois, has taken the position of Fieldman in the Farm Bureau Farm Management Service in the newly organized association in northwestern Illinois.

R. T. Burdick became Acting Head of the Department of Economics, Sociology, and History at the Colorado State College of Agriculture and Mechanical Arts on July 1 to succeed L. A. Moorehouse who was retired.

Carlson Christian, formerly Secretary and Manager of the Cleveland Milk Producers Federation, entered the employment of the Ohio State University on May 1 as Extension Economist in Marketing.

G. H. Craig, Associate Professor of Agricultural Economics, Montana State College, has accepted a position with the Food Distribution Administration, in Washington, D. C.

Grady B. Crowe, formerly Acting Associate Agricultural Economist at Virginia Polytechnic Institute, has transferred to the Division of Farm Management and Costs, Bureau of Agricultural Economics, as Associate Agricultural Economist, assigned to the Appalachian Regional Staff with headquarters at Washington, D. C.

Julius C. Duebner has transferred from the War Manpower Commission in Berkeley, California, to the regional office of the Division of Farm Management and Costs, Bureau of Agricultural Economics, at Berkeley, as Associate Agricultural Economist.

Morris Evans, formerly with the Flood Control Investigations of the U. S. Department of Agriculture, has accepted a position of Associate Agricultural Economist at the New Mexico State College of Agriculture and Mechanical Arts.

Leo J. Fenske has resigned from his position in the Department of Agricultural Economics and Rural Sociology at the University of Tennessee to join the staff of the Division of Farm Management and Costs, Bureau of Agricultural Economics, as Associate Agricultural Economist, assigned to the regional office at Little Rock, Arkansas.

A. H. Harrington, graduate of Cornell and formerly graduate student at the University of Illinois, is now Assistant Professor of Agricultural Economics at Alabama Polytechnic Institute.

Wells E. Hunt, formerly Manager of the Pork and Provision Division of the William Schluderberg-T. J. Kurdle Company, Baltimore, has accepted a position as consultant in livestock and meats and has been assigned to the Livestock and Meats Branch of the Food Distribution Administration.

Berryman Hurt, Agricultural Economist, has returned to the Division of Farm Management and Costs, Bureau of Agricultural Economics, from the War Food Administration.

Donald M. Keyes, formerly Project Supervisor of Soil Conservation Service Research Projects in West Virginia, has joined the Division of Farm Management and Costs, Bureau of Agricultural Economics, as Associate Agricultural Economist, assigned to the Appalachian Region with headquarters in Washington, D. C.

Gerald A. Lee, recently joined the staff of the Agricultural Extension Service of the State College of Washington. He is Extension Specialist in Marketing.

Charles C. Mantle, formerly of Iowa State College, has been appointed Assistant Agricultural Economist, University of Tennessee.

Clyde Mitchell, formerly Program Analyst for Farm Security Administration in Dallas, Texas, was transferred to the Food Distribution Administration as a Senior Agricultural Economist in the Requirements and Allocations Control Section.

George Montgomery, who was loaned to the Office of Price Administration to serve as Head of the Grain and Feed Section, returned to his duties at Kansas State College on July 1.

L. A. Moorehouse retired as Head of the Department of Economics, Sociology, and History at the Colorado State College of Agriculture and Mechanics Arts on July 1. Professor Moorehouse held this position since the Department was organized in 1922. Previously he was associated with the Division of Farm Management and Costs, Bureau of Agricultural Economics.

W. K. McPherson, formerly Economist at Alabama Polytechnic Institute, is now Principal Economist with Food Distribution Administration and is stationed in Atlanta, Georgia.

Milo J. Peterson, recently with the Department of Agricultural Economics and Rural Sociology, Clemson Agricultural College, has joined the Division of Farm Management and Costs, Bureau of Agricultural Economics, as Agricultural Economist, assigned to the regional office at Atlanta, Georgia.

C. W. Pitchford, has been appointed Agent in the Agricultural Marketing Administration with headquarters at Clemson College, South Carolina.

Waldo S. Rowan, formerly Assistant Agricultural Economist, University of Tennessee, who has recently been in the United States Army Air Corps, has been granted a furlough for a few months and is again employed by the University.

W. K. Sebrell, of the Public Health Service, has been made Associate Chief of the Nutrition and Food Conservation Branch of the Food Distribution Administration.

Morris H. Taylor, Associate Agricultural Economist with the Division

of Land Economics, Bureau of Agricultural Economics, with headquarters at the North Dakota Agricultural College, Fargo, North Dakota, has resigned to take over the management of his father's farm near Ogden, Utah, replacing his brother who has been called into Service.

Gerald B. Thorne was appointed as consultant on wartime policy matters concerning livestock and meats in the War Food Administration, in April, 1943. He was formerly Vice-President of Wilson and Company, Chicago.

John F. Timmons, Agricultural Economist, has returned to the Division of Land Economics following two years of graduate study in Agricultural Economics at the University of Wisconsin.

E. C. Waples is on leave of absence during the summer from Purdue University to complete his doctorate at the University of Wisconsin.

Russell M. Wilder, who has been on leave of absence from the Mayo Clinic since January of this year, is serving the Food Distribution Administration as Chief of the Civilian Food Requirements Branch. He is also a member of the Food Advisory Committee. As Chief of the Civilian Food Requirements Branch, Dr. Wilder—and his organization—function as "claimant" for the requirements of civilian consumers in the processes of considering and allocating United States food supplies among the civilian population, military services, the territories, our Allies, and for other export. In developing and presenting the food requirements of the civilian population, he and his staff are receiving assistance from the Food and Nutrition Board of the National Research Council, the Agricultural Research Administration, and other agencies of Government.

M. L. Wilson, Director of Extension Service has been made Chief of the Nutrition and Food Conservation Branch of the Food Distribution Administration.

HONOR ROLL

Agricultural Economists in the Armed Services of the United States*

Alkins, Maurice D.	Food Distribution Admn.	Marine Corps
Allhands, Frank H.	Food Distribution Admn.	Navy
Allstetter, Wm. R.	Food Distribution Admn.	Army
Andrews, Guy	Food Distribution Admn.	Navy
Bagnell, Douglas	Food Distribution Admn.	Army
Bain, Byford W.	Food Distribution Admn.	Navy
Baumann, Bruce H.	Food Distribution Admn.	Army
Becker, Edward D.	Food Distribution Admn.	Army
Bishop, Geo. R.	Food Distribution Admn.	Army
Booker, Edward D.	Food Distribution Admn.	Army
Brockmeyer, Harvey	University of Wyo.	Army
Burke, Thos. G.	Food Distribution Admn.	Army
Callander, Ronald C.	Food Distribution Admn.	Navy
Camalier, Robt. P.	Food Distribution Admn.	Army
Carey, Jas. W.	Food Distribution Admn.	Navy
Castles, Ira C.	Farm Credit Admn.	Army
Chapman, Milton V.	Food Distribution Admn.	Army
Cladakis, Nick J.	Food Distribution Admn.	Army
Clutwood, Clarson	Food Distribution Admn.	Army
Coburn, John F., Jr.	Food Distribution Admn.	Navy
Cook, Millard J.	Food Distribution Admn.	Army
Coughlin, F. R.	University of Ill.	Army
Crockett, Samuel L.	Bur. Agri. Econ. USDA	Army
Davis, Jefferson	Food Distribution Admn.	Army
Davis, Wm. A.	Food Distribution Admn.	Army
Eastman, Geo. R.	Food Distribution Admn.	Army
Finner, Winn F.	Bur. Agri. Econ. USDA	Navy
Fisher, Evan T.	Food Distribution Admn.	Army
Fleming, Seldon R.	Food Distribution Admn.	Army
Floyd, English H.	Food Distribution Admn.	Army
Folse, C. L.	Va. Polytechnic Institute	Army
Freeman, Stuart I.	Food Distribution Admn.	Army
Freemyer, G. W.	Milk Marketing Admn.	Army
Gallahue, Edward E.	Food Distribution Admn.	Navy
Gearreald, T. N.	Va. Polytechnic Institute	Army
Genske, Jos. C.	Food Distribution Admn.	Army
Gregory, Marvin C.	Food Distribution Admn.	Army
Gromen, Norman, Jr.	Food Distribution Admn.	Army
Gura, Benj.	Food Distribution Admn.	Army
Hadsell, Reighn S.	Food Distribution Admn.	Army
Hammar, Conrad H.	University of Mo.	Army

* Only Agricultural Economists reported to the Editor as having joined the armed services since the publication of the May issue of the Journal are included in the list.

Hedlund, Floyd F.	Food Distribution Admn.	Army
Heiman, Edwin L.	Food Distribution Admn.	Army
Hoffman, Milton	Food Distribution Admn.	Army
Homan, Geo. F.	Food Distribution Admn.	Army
Huffman, Roy E.	Montana State College	Navy
Hughes, Kenneth M.	Food Distribution Admn.	Army
Jeter, Ervin R.	Food Distribution Admn.	Navy
Krechevsky, Isadore	Food Distribution Admn.	Army
Larson, J. Stanford	Food Distribution Admn.	Army
Lerud, Lester A.	Food Distribution Admn.	Army
Levin, Joe H.	Food Distribution Admn.	Army
Lubschutz, Bernard	Food Distribution Admn.	Army
Lyons, Jas. Grant	Food Distribution Admn.	Army
McClain, Gene H.	Food Distribution Admn.	Army
McGarry, Leo P.	Food Distribution Admn.	Army
McKay, Jas. C.	Food Distribution Admn.	Navy
McPhail, Kenneth H.	Food Distribution Admn.	Army
Mahan, J. N.	Ala. Polytechnic Institute	Navy
Menze, Robt. E.	Food Distribution Admn.	Army
Middleton, Edward F.	Food Distribution Admn.	Army
Miller, Leonard J.	Food Distribution Admn.	Army
Monerief, Wm. W.	Food Distribution Admn.	Army
Newton, C. Baxter	Food Distribution Admn.	Army
O'Hanlon, H. Murray	Food Distribution Admn.	Army
Oliver, Russell V.	Food Distribution Admn.	Army
Owen, Paul S.	Food Distribution Admn.	Army
Parker, Leonard W.	Food Distribution Admn.	Navy
Payne, Wm. K.	Food Distribution Admn.	Army
Penry, Melborn E.	Food Distribution Admn.	Army
Pick, Charles F.	Food Distribution Admn.	Navy
Pinkham, Fabian	Food Distribution Admn.	Army
Rada, E. L.	Oregon State College	Navy
Richards, Preston	Food Distribution Admn.	Army
Roberts, Wm. E.	Food Distribution Admn.	Army
Rolfsness, Stanley C.	Food Distribution Admn.	Army
Schoonover, Ralph M.	Food Distribution Admn.	Army
Scofield, W. H.	Bur. Agri. Econ. USDA	Army
Shaffer, Wm. A.	Food Distribution Admn.	Army
Sherman, L. G.	Food Distribution Admn.	Navy
Sinovick, Sam M.	Food Distribution Admn.	Army
Soule, Geo. H., Jr.	Food Distribution Admn.	Army
Soxman, R. C.	Food Distribution Admn.	Army
Stassi, Hy. C.	Food Distribution Admn.	Army
Stewart, John B.	Food Distribution Admn.	Army
Stewart, John W.	Food Distribution Admn.	Army
Stoddard, Charles H., Jr.	Bur. Agri. Econ. USDA	Navy
Sullivan, Jos.	Food Distribution Admn.	Army
Thomas, Morgan	Food Distribution Admn.	Army

Thompson, Wm. N.	University of Ill.	Army
Tierney, Dan L.	Food Distribution Admn.	Army
Upchurch, Melvin L.	Bur. Agri. Econ. USDA	Army
Walker, Herman, Jr.	Bur. Agri. Econ. USDA	Army
Walters, Alfred W.	Food Distribution Admn.	Army
Warren, S. I.	University of Ill.	Army
Watson, Andrew E.	University of Maine	Navy
Weinland, Donald A.	Food Distribution Admn.	Army
Wilson, Charles Peairs	Kansas State College	Army
Wilson, Richard A.	Food Distribution Admn.	Navy
Winfrey, Ralph E.	Food Distribution Admn.	Army
Winarsky, David	Food Distribution Admn.	Army
Wrinkel, Roy	Food Distribution Admn.	Army

BOOKS FOR THE ARMED SERVICES

There are so many worthy causes competing for contributions these days, that anyone with limited funds finds difficulty in deciding where to give the amount available. With generous purses strained to the limit, it's a pleasure to be asked merely to give things we have already enjoyed ourselves.

Drives to collect used newspapers, scrap, old silk stockings have met with spectacular success. But there is another drive for things people have already used and enjoyed—the 1943 Victory Book Campaign which is sponsored by the American Library Association, the American Red Cross and the United Service Organizations.

This, however, is definitely *not* a drive for old, dog-eared tattered books. It is a campaign for collecting books that readers have read and enjoyed themselves and which they would like to pass on to some friends—in this case, sailors, soldiers or marines, Coast Guardsmen with tastes similar to their own.

Books donated to the 1943 Victory Book Campaign should be in good physical condition, books which gave such pleasure to their owners that they will surely appeal to fighting men with similar tastes.

Most of the men in the army are young, between 20 and 40 years of age. They range from ex-truck drivers to ex-lawyers and authors. Some have three college degrees and others never finished grammar school. But most of them like to read in their leisure hours, and their present reading preferences are just what they were in civilian life.

Special Services officers of the Army and Navy say that, on the whole, the men are avid for "best sellers," both fiction and non-fiction. Many of them find distraction in western stories, detective fiction, adventure tales. They are anxious to learn new things while in the Army, so they want technical books (published since 1935) on such subjects as chemistry, mathematics, mechanical drawing, photography and shop mechanics. Any such books, in good physical condition, that readers take from their store of used books, will be considered treasure trove when they appear in camp libraries.

The 1943 Victory Book Campaign is a real opportunity to share with our fighting men the pleasure books have given you. To make sure they share your books, take them yourself to the nearest public library—and see that your friends and neighbors do the same.